elesa+GANTER

Accessories for hydraulic systems

Accessories for
hydraulic systems

GENERAL INDEX

ELESA+GANTER® is a commercial joint-venture between the two world leaders of standard machine elements: Elesa S.p.A (Monza, Milano, Italy) and Otto Ganter GmbH & Co. KG (Furtwangen, Germany).

ELESA® (founded in 1941) and OTTO GANTER (founded in 1894) have been co-operating for more than 40 years to create market synergies and to develop products which are in line with the market.

In 1995 the two companies started to set up a common sales network under the trademark ELESA+GANTER® to offer the widest range of standard machine elements with a unique design, a perfect service and with the ability to create special customized solutions in a very short time.

The joint-venture made its first steps into the East-European market and today it covers more than 35 industrialised countries.

In order to create a closer relationship with the customers, ELESA+GANTER branch offices were founded: ELESA+GANTER Austria, ELESA-GANTER Iberica (Spain), ELESA+GANTER Polska (Poland), ELESA+GANTER China and ELESA+GANTER CZ (Czech Republic).

A full localised stockholding of standard elements, trained staff and an on-site machining service combine to provide a wealth of knowledge to the customers. Almost all the requirements can be easily satisfied when dealing with metal and plastic elements.

Thanks to the close liaison with well educated engineers from ELESA and GANTER special technical solutions can be developed focusing on design, performance and industry quality.

ERP systems are the heart of a powerful service. Managing and controlling every step in the production, logistics and offices. Full stock availability ensures complete deliveries on time.

Points of strength

- technological background of the two established mother companies
- innovation in combination with decades of experience
- unique design
- optimised and widest product range of standard machine elements, driven by the market
- worldwide distribution network
- full stock availability with fast delivery times
- customised solutions
- perfect service including technical assistance

The Original design is one of the most relevant characteristics of the ELESA+GANTER elements, coming from a combination of thorough ergonomic research and special styling care. The products are protected by more than 150 international patents and they have been selected and awarded by the most prestigious international Industrial Design juries, such as "International Forum Design" Hannover (Germany), "Design Center" Stuttgart (Germany), "Compasso d'Oro" Milan (Italy) and "Fluidtrans Compomac" Milan (Italy), Good Design Award (Japan).

WORLDWIDE SALES NETWORK

Europe
Austria, Belgium, Bosnia-Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxemburg, Macedonia, The Netherlands, Norway, Poland, Portugal, Rumania, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey.

Asia
China, India, Indonesia, Israel, Japan, Singapore, South-Korea, Taiwan, Thailand.

Africa
South Africa.

Oceania
Australia, New Zealand.

America
Argentina, Brazil, Canada, Mexico, USA.

Elesa+Ganter Austria GmbH

Elesa-Ganter Iberica S.L. (Spain)

Elesa+Ganter Polska Sp. zo.o. (Poland)

Elesa+Ganter CZ s.r.o. (Czech Republic)

Elesa+Ganter India PVT LTD.

Elesa+Ganter China Ltd.

Elesa+Ganter Turkey

After more than 70 years leadership in the design and manufacture of new and innovative standard machine elements for the mechanical industry made up of a wide variety of engineering plastics, ELESA has earned the status of reference point for designers and builders.

37 International Awards in Industrial Design over the last 35 years, prove a business culture focused on its natural inclination for design and ergonomic product features.

Modern and flexible manufacturing facilities with fully automatic production units and vast stock availability ensure the highest level of service and a timely distribution via a worldwide network.

An R&D technical competence together with a high performing test laboratory allow the transformation of specific customer needs into new customised solutions, in addition to the widest range of standard items available on the market.

ISO 14001 certification of ELESA's manufacturing facilities, shows a firm commitment in respect to the environment.

Environmentally Conscious Manufacturing

ELESA Headquarters - Monza (Milan) Italy

Logistic centre

R&D Department - Test Laboratory

elesa Standards

ERGOSTYLE® by ELESA

elesa Clayton

bsi. ISO 9001 Quality Management

bsi. ISO 14001 Environmental Management

bsi. OHSAS 18001 Occupational Health and Safety Management

AEO

Elesa France S.A.

Elesa (UK) Ltd.

Elesa USA Corporation

Elesa Scandinavia AB

Automatic production unit

For more than 100 years, Ganter has designed and manufactured standard machine elements made of a wide variety of different metallic materials and by applying a unique variety of manufacturing methods and surface treatments.

Why is Ganter the supplier of choice for standard machine elements for all industrial sectors worldwide? We combine a thorough understanding of the need of mechanical engineers with expertise in the exacting requirements of machine design.

We then maintain an extensive product range and provide customers with excellent support services.

Ganter is proud to define customer orientation as the core of its business philosophy, expressed for example by the capability to design and manufacture special executions for specific customer needs or by an automated warehouse, which allows timely and complete deliveries.

There is no minimum order limit on standard items. We can also deliver portions of large custom orders, on an as-needed basis, for your just-in-time manufacturing.

Modern rotary indexing systems

Automated powder coating

For custom orders, our dedicated Service Centre configures single standard parts, or combinations of parts, to suit your specific needs regarding shape and function.

Automated placement

Fully automated high rack warehouse

Full product range

1 Operating elements

Spoked handwheels
Solid handwheels
Arm handwheels
Crank handles

2 Clamping knobs

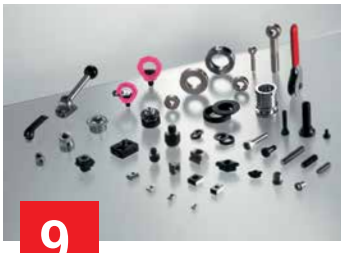
Lobe knobs
Star knobs
Grip knobs
Wing knobs

3 Clamping levers

Adjustable handles
Lever handles

4 U-Handles

Bridge and pull handles
Safety handles
Flush pull handles
Tubular handles



9 Machine elements

Grub screws and thrust pads
T-nuts
Rings and washers
Ball transfer units
Cam locking levers
Clamps

10 Joints

Universal joints
Ball joints
Angled ball joints

11 Levelling elements

Plastic bases
Metal bases
End caps
Flexible automation components
Connecting clamps and angles

12 Hinges

Plastic hinges
Metal hinges

17 Castor and Wheels

Injected polyurethane wheels
Technopolymer wheels
Rubber wheels

18 Retaining magnets

Flat gripper
Rod glipper
Button-type / U-Magnets

5

Fixed, revolving and fold-away handles

T-handles
Ball knobs
Fixed handles
Revolving handles
Fold-away handles

6

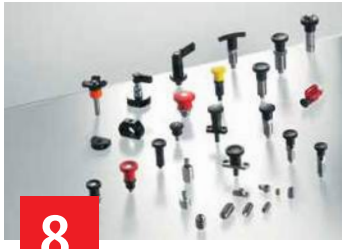
Control elements

Control knobs
Control levers
Adjustable slide units

7

Rotary controls

Gravity indicators
Positive drive indicators
Handwheels/handknobs
Direct drive indicators



8

Indexing elements

Indexing plungers
Cam action indexing plungers
Side thrust pins
Spring plungers
Lock pins

13

Latches

Locks
Latches with handles
Latches with key
Latches with key and handles

14

Toggle, power and hook clamps

Toggle clamps
Clamping bolts
Power clamps
Hook clamps

15

Accessories for hydraulic systems

Plugs
Breather caps
Oil level indicators
Column level indicators

16

Tube clamp connectors

Two way connector clamps
Swivel clamp connector joints
Linear actuators

PICTORIAL INDEX

TN.

ELESA Original design

Plugs

RoHS PA +130°C -30°C

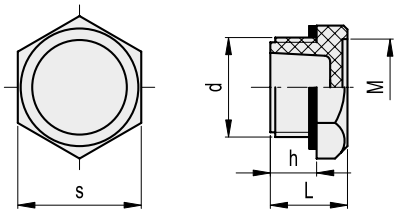
- **Material**
  Glass-fibre reinforced polyamide based (PA) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
- **Colour**
  Black, matte finish.
- **Flat packing ring**
  NBR synthetic rubber.
- **Maximum continuous working temperature**
  100°C.

Accessories on request

TN. plugs are suitable for mounting MH. aluminium plates with graphic symbols (see page 13).

Technical data

An adequate tightening torque (see table below) is recommended when screwing the plug, so as to guarantee optimal tightness without any deformation of the packing ring. Suggested tightening torque is the result of laboratory tests carried out at ambient temperature (23°C) with plug, packing ring and reservoir walls perfectly cleaned.



Standard Elements		Main dimensions					Tightening torque	⚖
Code	Description	d	h	s	L	M	[Nm]	g
58284	TN.10x1.5	M10x1.5	9	19	16	15	4÷5	4
58285	TN.12x1.5	M12x1.5	9	19	16	15	6÷8	4
58286	TN.14x1.5	M14x1.5	9	19	16	15	6÷8	5
58287	TN.16x1.5	M16x1.5	9	22	16	17	8÷10	7
58288	TN.18x1.5	M18x1.5	11	26	18	20.5	8÷10	8
58289	TN.20x1.5	M20x1.5	11	26	18	20.5	8÷10	8
58290	TN.22x1.5	M22x1.5	12	32	20	25	10÷12	12
58291	TN.25x1.5	M25x1.5	12	32	20	25	10÷12	12
58292	TN.26x1.5	M26x1.5	12	32	20	25	10÷12	14
58293	TN.35x1.5	M35x1.5	13	38	22	31	15÷18	15
58401	TN.40x1.5	M40x1.5	14	46	24	38	15÷18	20
58294	TN.1/8	G 1/8	9	19	16	15	4÷6	4
58295	TN.1/4	G 1/4	9	19	16	15	4÷6	4
58296	TN.3/8	G 3/8	9	22	16	17	8÷10	5
58297	TN.1/2	G 1/2	11	26	18	20.5	8÷10	8
58298	TN.3/4	G 3/4	12	32	20	25	10÷12	14
58299	TN.1	G 1	13	38	22	31	12÷15	18
58411	TN.1¼	G1¼	14	46	24	38	15÷18	20
58413	TN.1½	G1½	15	55	26	46	15÷18	24

TN-EX

ELESA Original design

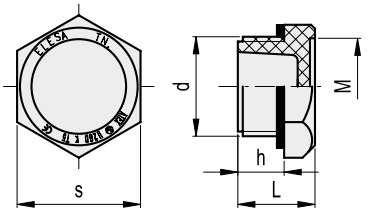
Plugs

RoHS PA +100°C -30°C

- **Material**
  Glass-fibre reinforced polyamide based (PA) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
- **Colour**
  Black, matte finish.
- **Flat packing ring**
  NBR synthetic rubber.
- **ATEX directive compliance**
  The plugs of the TN-EX series comply with Health and Safety Requirements intended in 94/9/EC ATEX European Directive (explosive atmospheres) for equipments in Group II, category 2GD. Plugs have "k" protection degree and can therefore be mounted in equipments protected by means of "immersion in liquid", without lowering protection degree.
  II 2 G D k T5, marked on the TN-EX plugs, represents the identification according to ATEX directive.
  II: group of substances for which the product is suitable
  2: identification of the category
  G: identification of the type of explosive atmosphere (Gases or vapours)
  D: identification of the type of explosive atmosphere (Dust)
  k: protection degree by means of immersion in liquid (kX only for TN.3/4)
  T5: temperature class
  Ambient and/or fluid temperature: -30 ÷ +100°C
  The declaration of conformity to European Directives of this product is available and it is part of the product itself.

Technical data

The tightening torque indicated in the table guarantees an optimal tightness, keeping the packing ring in the correct position.



Standard Elements		Main dimensions					Tightening torque	⚖
Code	Description	d	h	s	L	M	[Nm]	g
58296-EX	TN.3/8-EX	G 3/8	9	22	16	17	8÷10	5
58297-EX	TN.1/2-EX	G 1/2	11	26	18	20.5	8÷10	8
58298-EX	TN.3/4-EX	G 3/4	12	32	20	25	10÷12	14

TNR.

ELESA Original design

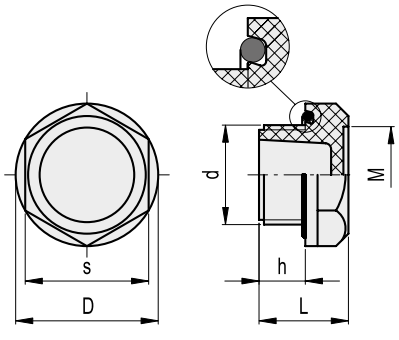
Plugs

RoHS PA +100°C -30°C

- **Material**
  Glass-fibre reinforced polyamide based (PA) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
- **Colour**
  Black, matte finish.
- **Packing ring**
  NBR synthetic rubber O-Ring.
- **Maximum continuous working temperature**
  100°C.

Accessories on request

TNR. plugs are suitable for mounting aluminium plates with graphic symbols type MH. (see page 13).



Standard Elements		Main dimensions						Tightening torque	⚖
Code	Description	d	h	D	s	L	M	[Nm]	g
158295	TNR.1/4	G 1/4	9	22	19	17	15	4÷6	4
158296	TNR.3/8	G 3/8	9	25.5	22	18	17	8÷10	6
158297	TNR.1/2	G 1/2	11	32	27	20	20.5	8÷10	8
158298	TNR.3/4	G 3/4	12	37	32	22	25	10÷12	14
158299	TNR.1	G 1	13	44	38	23	31	12÷15	18
158411	TNR. 1¼	G 1¼	14	53.5	46	26	38	15÷18	32
158413	TNR.1½	G 1½	15	63.5	55	28	46	15÷18	51

MH.

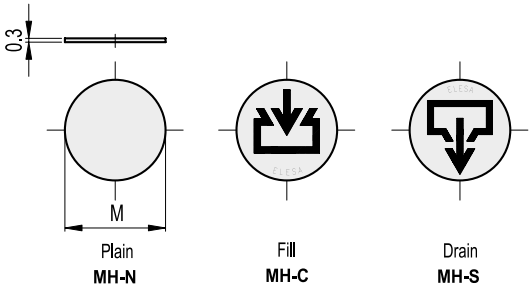
Plates with graphic symbols for oil plugs

RoHS +130°C -30°C

- **Material**
  Matte anodised aluminium with self-adhesive back for sticking to the plain surface of the plug head.
- **Standardized graphic symbols**
  - MH.N: plain surface, without symbols.
  - MH.C: with graphic symbol "fill" according to DIN regulations.
  - MH.S: with graphic symbol "drain" according to DIN regulations.
- **Maximum continuous working temperature**
  130°C.

Applications

The plates with graphic symbols for oil plugs are suitable for the application on plugs type TN. (see page 12), TNR. (see page 13), TCD. (see page 14) and TSD. (see page 16).



Neutral label		Fill label		Drain label		M *
Code	Description	Code	Description	Code	Description	Ø
39501	MH.19-N	39521	MH.19-C	39541	MH.19-S	15
39503	MH.22-N	39523	MH.22-C	39543	MH.22-S	17
39505	MH.26-N	39525	MH.26-C	39545	MH.26-S	20.5
39507	MH.32-N	39527	MH.32-C	39547	MH.32-S	25
39509	MH.38-N	39529	MH.38-C	39549	MH.38-S	31

M * = diameter of the seat of the correspondent plug.

TCD.

ELESA Original design

Oil fill plugs

RoHS PA +100°C -30°C

- **Material**
  Glass-fibre reinforced polyamide based (PA) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
  - TCD.: without side hole.
  - TCDF.: Ø 2 mm side breather hole.
- **Colour**
  Black, matte finish.
- **Flat packing ring**
  NBR synthetic rubber.
- **Maximum continuous working temperature**
  100°C.
- **Graphic symbol "fill"**
  According to DIN regulations.

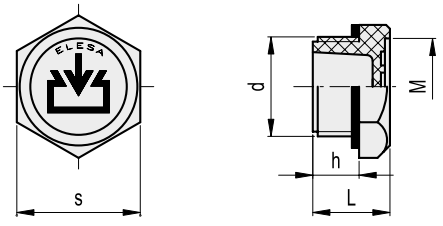
Accessories on request

TCD. and TCDF. oil fill plugs are suitable for mounting MH. aluminium plates with graphic symbols (see page 13).

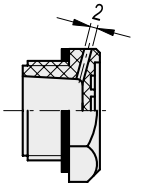
Technical data

An adequate tightening torque (see table below) is recommended when screwing the plug, so as to guarantee optimal tightness without any deformation of the packing ring. Suggested tightening torque is the result of laboratory tests carried out at ambient temperature (23°C) with plug, packing ring and reservoir walls perfectly cleaned.

TCD.



TCDF.



Standard Elements		Main dimensions					Tightening torque	
Code	Description	d	h	s	L	M	[Nm]	g
58551	TCD.10x1.5	M10x1.5	9	19	16	15	4÷5	4
58553	TCD.12x1.5	M12x1.5	9	19	16	15	6÷8	4
58555	TCD.14x1.5	M14x1.5	9	19	16	15	6÷8	5
58557	TCD.16x1.5	M16x1.5	9	22	16	17	8÷10	7
58559	TCD.18x1.5	M18x1.5	11	26	18	20.5	8÷10	8
58561	TCD.20x1.5	M20x1.5	11	26	18	20.5	8÷10	8
58563	TCD.22x1.5	M22x1.5	12	32	20	25	10÷12	12
58565	TCD.25x1.5	M25x1.5	12	32	20	25	10÷12	12
58569	TCD.26x1.5	M26x1.5	12	32	20	25	10÷12	14
58567	TCD.35x1.5	M35x1.5	13	38	22	31	15÷18	15
58571	TCD.40x1.5	M40x1.5	14	46	24	38	15÷18	20
58591	TCD.1/8	G 1/8	9	19	16	15	4÷6	4
58601	TCD.1/4	G 1/4	9	19	16	15	4÷6	4
58611	TCD.3/8	G 3/8	9	22	16	17	8÷10	5
58621	TCD.1/2	G 1/2	11	26	18	20.5	8÷10	8
58631	TCD.3/4	G 3/4	12	32	20	25	10÷12	14
58641	TCD.1	G 1	13	38	22	31	12÷15	18
58643	TCD.1¼	G 1¼	14	46	24	38	15÷18	20
58645	TCD.1½	G 1½	15	55	26	46	15÷18	24

Standard Elements		Main dimensions						Tightening torque	
Code	Description	d	h	s	L	M	d1	[Nm]	g
58651	TCDF.10x1.5	M10x1.5	9	19	16	15	2	4÷5	4
58653	TCDF.12x1.5	M12x1.5	9	19	16	15	2	6÷8	4
58655	TCDF.14x1.5	M14x1.5	9	19	16	15	2	6÷8	5
58657	TCDF.16x1.5	M16x1.5	9	22	16	17	2	8÷10	7
58659	TCDF.18x1.5	M18x1.5	11	26	18	20.5	2	8÷10	8
58661	TCDF.20x1.5	M20x1.5	11	26	18	20.5	2	8÷10	8
58663	TCDF.22x1.5	M22x1.5	12	32	20	25	2	10÷12	12
58665	TCDF.25x1.5	M25x1.5	12	32	20	25	2	10÷12	12
58681	TCDF.26x1.5	M26x1.5	12	32	20	25	2	10÷12	14
58667	TCDF.35x1.5	M35x1.5	13	38	22	31	2	15÷18	15
58683	TCDF.40x1.5	M40x1.5	14	46	24	38	2	15÷18	20
58669	TCDF.1/8	G 1/8	9	19	16	15	2	4÷6	4
58671	TCDF.1/4	G 1/4	9	19	16	15	2	4÷6	4
58673	TCDF.3/8	G 3/8	9	22	16	17	2	8÷10	5
58675	TCDF.1/2	G 1/2	11	26	18	20.5	2	8÷10	8
58677	TCDF.3/4	G 3/4	12	32	20	25	2	10÷12	14
58679	TCDF.1	G 1	13	38	22	31	2	12÷15	18
58685	TCDF.1¼	G 1¼	14	46	24	38	2	15÷18	20
58687	TCDF.1½	G 1½	15	55	26	46	2	15÷18	24

TCD+a

ELESA Original design

Oil fill plugs with flat dipstick

- **Material**
  Glass-fibre reinforced polyamide based (PA) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
  - TCD+a: without side hole.
  - TCDF+a: Ø 2 mm side breather hole.
- **Colour**
  Black, matte finish.
- **Flat packing ring**
  NBR synthetic rubber.
- **Flat dipstick**
  Phosphatised steel. On request and for sufficient quantities dipstick can be supplied in different lengths and/or complete with MAX-MIN level lines.
- **Maximum continuous working temperature**
  100°C.
- **Graphic symbol "fill"**
  According to DIN regulations.

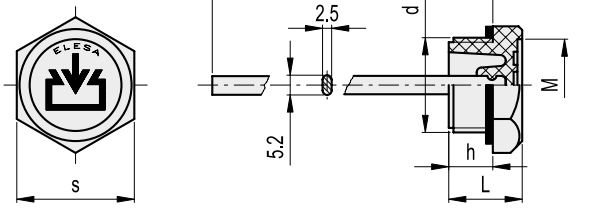
Accessories on request

TCD+a and TCDF+a oil fill plugs are suitable for mounting MH. aluminium plates with graphic symbols (see page 13).

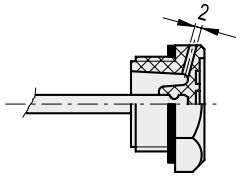
Technical data

An adequate tightening torque (see table below) is recommended when screwing the plug, so as to guarantee optimal tightness without any deformation of the packing ring. Suggested tightening torque is the result of laboratory tests carried out at ambient temperature (23°C) with plug, packing ring and reservoir walls perfectly cleaned.

TCD+a



TCDF+a



Standard Elements		Main dimensions						Tightening torque	⚖
Code	Description	d	h	s	L	M	a	[Nm]	g
59501	TCD.10x1.5+a	M10x1.5	9	19	16	15	120	4÷5	21
59503	TCD.12x1.5+a	M12x1.5	9	19	16	15	120	6÷8	21
59505	TCD.14x1.5+a	M14x1.5	9	19	16	15	120	6÷8	22
59507	TCD.16x1.5+a	M16x1.5	9	22	16	17	120	8÷10	22
59509	TCD.18x1.5+a	M18x1.5	11	26	18	20.5	195	8÷10	36
59511	TCD.20x1.5+a	M20x1.5	11	26	18	20.5	195	8÷10	37
59513	TCD.22x1.5+a	M22x1.5	12	32	20	25	195	10÷12	40
59515	TCD.25x1.5+a	M25x1.5	12	32	20	25	195	10÷12	40
59517	TCD.26x1.5+a	M26x1.5	12	32	20	25	195	10÷12	42
59519	TCD.35x1.5+a	M35x1.5	13	38	22	31	195	15÷18	44
59523	TCD.40x1.5+a	M40x1.5	14	46	24	38	195	15÷18	49
59531	TCD.1/8+a	G 1/8	9	19	16	15	120	4÷6	22
59533	TCD.1/4+a	G 1/4	9	19	16	15	120	4÷6	22
59535	TCD.3/8+a	G 3/8	9	22	16	17	120	8÷10	22
59537	TCD.1/2+a	G 1/2	11	26	18	20.5	195	8÷10	37
59539	TCD.3/4+a	G 3/4	12	32	20	25	195	10÷12	40
59541	TCD.1+a	G 1	13	38	22	31	195	12÷15	44
59543	TCD.1¼+a	G 1¼	14	46	24	38	195	15÷18	49
59545	TCD.1½+a	G 1½	15	55	26	46	195	15÷18	53

Standard Elements		Main dimensions							Tightening torque	⚖
Code	Description	d	h	s	L	M	d1	a	[Nm]	g
59557	TCDF.16x1.5+a	M16x1.5	9	22	16	17	2	120	8÷10	15
59559	TCDF.18x1.5+a	M18X1.5	11	26	18	20.5	2	195	8÷10	30
59561	TCDF.20x1.5+a	M20x1.5	11	26	18	20.5	2	195	8÷10	30
59563	TCDF.22x1.5+a	M22x1.5	12	32	20	25	2	195	10÷12	35
59565	TCDF.25x1.5+a	M25x1.5	12	32	20	25	2	195	10÷12	35
59567	TCDF.26x1.5+a	M26x1.5	12	32	20	25	2	195	10÷12	35
59569	TCDF.35x1.5+a	M35x1.5	13	38	22	31	2	195	15÷18	40
59573	TCDF.40x1.5+a	M40x1.5	14	46	24	38	2	195	15÷18	49
59585	TCDF.3/8+a	G 3/8	9	22	16	17	2	120	8÷10	20
59587	TCDF.1/2+a	G 1/2	11	26	18	20.5	2	195	8÷10	30
59589	TCDF.3/4+a	G 3/4	12	32	20	25	2	195	10÷12	35
59591	TCDF.1+a	G 1	13	38	22	31	2	195	12÷15	45
59595	TCDF.1¼+a	G 1¼	14	46	24	38	2	195	15÷18	49
59597	TCDF.1½+a	G 1½	15	55	26	46	2	195	15÷18	53

TSD.

ELESA Original design

Oil drain plugs

RoHS PA +100°C -30°C

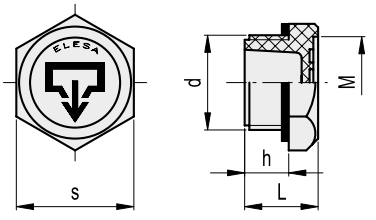
- **Material**
  Glass-fibre reinforced polyamide based (PA) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
- **Colour**
  Red similar to RAL 3000, matte finish.
- **Flat packing ring**
  NBR synthetic rubber.
- **Maximum continuous working temperature**
  100°C.
- **Graphic symbol "drain"**
  According to DIN regulations.

Accessories on request

TSD. plugs are suitable for mounting MH. aluminium plates with graphic symbols (see page 13).

Technical data

An adequate tightening torque (see table below) is recommended when screwing the plug, so as to guarantee optimal tightness without any deformation of the packing ring. Suggested tightening torque is the result of laboratory tests carried out at ambient temperature (23°C) with plug, packing ring and reservoir walls perfectly cleaned.



Standard Elements		Main dimensions					Tightening torque	⚖
Code	Description	d	h	s	L	M	[Nm]	g
59942	TSD.10x1.5	M10x1.5	9	19	16	15	4÷5	4
59944	TSD.12x1.5	M12x1.5	9	19	16	15	6÷8	4
59946	TSD.14x1.5	M14x1.5	9	19	16	15	6÷8	5
59948	TSD.16x1.5	M16x1.5	9	22	16	17	8÷10	7
59950	TSD.18x1.5	M18x1.5	11	26	18	20.5	8÷10	8
59952	TSD.20x1.5	M20x1.5	11	26	18	20.5	8÷10	8
59954	TSD.22x1.5	M22x1.5	12	32	20	25	10÷12	12
59956	TSD.25x1.5	M25x1.5	12	32	20	25	10÷12	12
59958	TSD.26x1.5	M26x1.5	12	32	20	25	10÷12	14
59960	TSD.35x1.5	M35x1.5	13	38	22	31	15÷18	15
59964	TSD.40x1.5	M40x1.5	14	46	24	38	15÷18	20
59972	TSD.1/8	G 1/8	9	19	16	15	4÷6	4
59974	TSD.1/4	G 1/4	9	19	16	15	4÷6	4
59976	TSD.3/8	G 3/8	9	22	16	17	8÷10	5
59978	TSD.1/2	G 1/2	11	26	18	20.5	8÷10	8
59980	TSD.3/4	G 3/4	12	32	20	25	10÷12	14
59982	TSD.1	G 1	13	38	22	31	15÷18	18
59986	TSD.1¼	G 1¼	14	46	24	38	15÷18	20
59988	TSD.1½	G 1½	15	55	26	46	15÷18	24

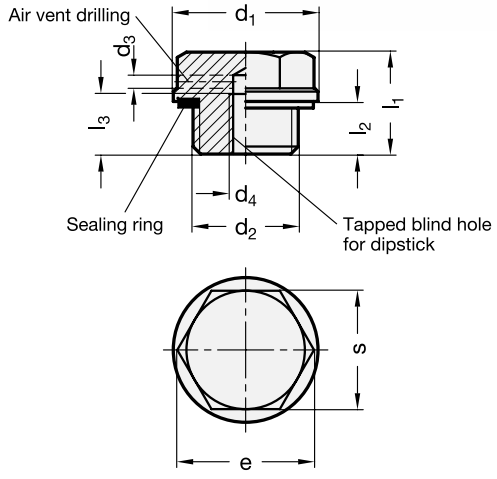
GN 741

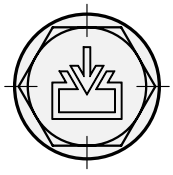
Plugs

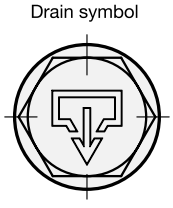
- **Material**
  Aluminium, fine turned finish.
  - **Version OS**: plain.
  - **Version AS**: plugs with laser engraved graphic symbol "drain", according to DIN regulations.
  - **Version ES**: plugs with laser engraved graphic symbol "fill", according to DIN regulations.
- **Flat packing ring**
  NBR synthetic rubber.
- **Maximum continuous working temperature**
  100°C.

Special executions on request
(For sufficient quantities)
Plugs with Ø 2 mm (d2) side breather hole (Execution 2 with vent drilling).

Features
GN 741 plugs are provided with a threaded blind hole for assembling a dipstick.







Standard Elements	Main dimensions									⚖
Description	d1	d2	d3	d4	l1	l2	t	s	e ≈	g
GN 741-19-M14x1.5-OS-*	19	M14x1.5	2	M5	15.5	8	8	15	17.3	7
GN 741-19-M14x1.5-ES-*	19	M14x1.5	2	M5	15.5	8	8	15	17.3	7
GN 741-19-M14x1.5-AS-*	19	M14x1.5	2	M5	15.5	8	8	15	17.3	7
GN 741-22-M16x1.5-OS-*	22	M16x1.5	2	M5	15.5	8	8	18	20.8	10
GN 741-22-M16x1.5-ES-*	22	M16x1.5	2	M5	15.5	8	8	18	20.8	10
GN 741-22-M16x1.5-AS-*	22	M16x1.5	2	M5	15.5	8	8	18	20.8	10
GN 741-26-M20x1.5-OS-*	26	M20x1.5	2	M5	16	8.5	8	21	24.3	15
GN 741-26-M20x1.5-ES-*	26	M20x1.5	2	M5	16	8.5	8	21	24.3	15
GN 741-26-M20x1.5-AS-*	26	M20x1.5	2	M5	16	8.5	8	21	24.3	15
GN 741-32-M26x1.5-OS-*	32	M26x1.5	2	M5	17	9	8	27	31.2	26
GN 741-32-M26x1.5-ES-*	32	M26x1.5	2	M5	17	9	8	27	31.2	26
GN 741-32-M26x1.5-AS-*	32	M26x1.5	2	M5	17	9	8	27	31.2	26
GN 741-32-M27x1.5-OS-*	32	M27x1.5	2	M5	17	9	8	27	31.2	35
GN 741-32-M27x1.5-ES-*	32	M27x1.5	2	M5	17	9	8	27	31.2	35
GN 741-32-M27x1.5-AS-*	32	M27x1.5	2	M5	17	9	8	27	31.2	35
GN 741-40-M33x1.5-OS-*	40	M33x1.5	2	M5	19.5	11	8	32	37	47
GN 741-40-M33x1.5-ES-*	40	M33x1.5	2	M5	19.5	11	8	32	37	47
GN 741-40-M33x1.5-AS-*	40	M33x1.5	2	M5	19.5	11	8	32	37	47
GN 741-50-M40x1.5-OS-*	50	M40x1.5	2	M5	21	12	8	41	47.3	80
GN 741-50-M40x1.5-ES-*	50	M40x1.5	2	M5	21	12	8	41	47.3	80
GN 741-50-M40x1.5-AS-*	50	M40x1.5	2	M5	21	12	8	41	47.3	80
GN 741-50-M42x1.5-OS-*	50	M42x1.5	2	M5	21	12	8	41	47.3	80
GN 741-50-M42x1.5-ES-*	50	M42x1.5	2	M5	21	12	8	41	47.3	80
GN 741-50-M42x1.5-AS-*	50	M42x1.5	2	M5	21	12	8	41	47.3	80

Standard Elements	Main dimensions									⚖
Description	d1	d2	d3	d4	l1	l2	t	s	e ≈	g
GN 741-50-M42x2-OS-*	50	M42x2	2	M5	21	12	8	41	47.3	80
GN 741-50-M42x2-ES-*	50	M42x2	2	M5	21	12	8	41	47.3	80
GN 741-50-M42x2-AS-*	50	M42x2	2	M5	21	12	8	41	47.3	80
GN 741-19-G1/4-OS-*	19	G1/4	2	M5	15.5	8	8	15	17.3	7
GN 741-19-G1/4-ES-*	19	G1/4	2	M5	15.5	8	8	15	17.3	7
GN 741-19-G1/4-AS-*	19	G1/4	2	M5	15.5	8	8	15	17.3	7
GN 741-22-G3/8-OS-*	22	G3/8	2	M5	15.5	8	8	18	20.8	10
GN 741-22-G3/8-ES-*	22	G3/8	2	M5	15.5	8	8	18	20.8	10
GN 741-22-G3/8-AS-*	22	G3/8	2	M5	15.5	8	8	18	20.8	10
GN 741-26-G1/2-OS-*	26	G1/2	2	M5	16	8.5	8	21	24.3	15
GN 741-26-G1/2-ES-*	26	G1/2	2	M5	16	8.5	8	21	24.3	15
GN 741-26-G1/2-AS-*	26	G1/2	2	M5	16	8.5	8	21	24.3	15
GN 741-32-G3/4-OS-*	32	G3/4	2	M5	17	9	8	27	31.2	26
GN 741-32-G3/4-ES-*	32	G3/4	2	M5	17	9	8	27	31.2	26
GN 741-32-G3/4-AS-*	32	G3/4	2	M5	17	9	8	27	31.2	26
GN 741-40-G1-OS-*	40	G1	2	M5	19.5	11	8	32	37	47
GN 741-40-G1-ES-*	40	G1	2	M5	19.5	11	8	32	37	47
GN 741-40-G1-AS-*	40	G1	2	M5	19.5	11	8	32	37	47
GN 741-50-G1 1/4-OS-*	50	G1 1/4	2	M5	21	12	8	41	47.3	80
GN 741-50-G1 1/4-ES-*	50	G1 1/4	2	M5	21	12	8	41	47.3	80
GN 741-50-G1 1/4-AS-*	50	G1 1/4	2	M5	21	12	8	41	47.3	80
GN 741-60-G1 1/2-OS-*	60	G1 1/2	2	M5	22	13	18	50	57.7	120
GN 741-60-G1 1/2-ES-*	60	G1 1/2	2	M5	22	13	8	50	57.7	120
GN 741-60-G1 1/2-AS-*	60	G1 1/2	2	M5	22	13	8	50	57.7	120

*Complete the description of the standard item needed by adding 1 (without vent drilling) or 2 (with vent drilling).

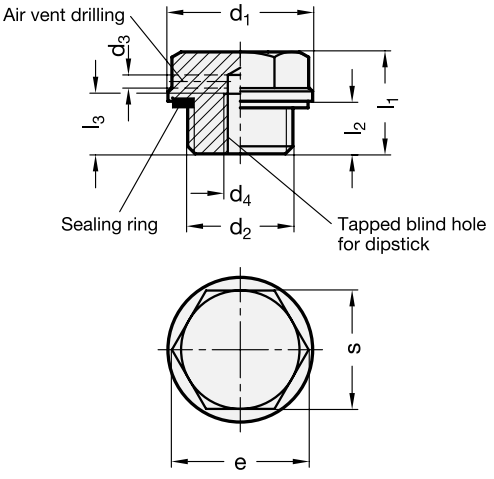
GN 742

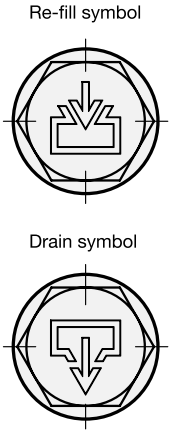
Plugs for application with high temperatures

RoHS +180°C -30°C

- **Material**
  Aluminium, fine turned finish.
  - **Version OS**: plain.
  - **Version AS**: plugs with laser engraved graphic symbol "drain", according to DIN regulations.
  - **Version ES**: plugs with laser engraved graphic symbol "fill", according to DIN regulations.
- **Flat packing ring**
  FPM (type VITON®, registered mark by DuPont Dow Elastomers). Identification by not black finish.
- **Maximum continuous working temperature**
  180°C.
- **Standard versions available**
  - Identification no. **1**: without vent trilling.
  - Identification no. **2**: with vent trilling.

Features and applications
GN 742 plugs are provided with a threaded blind hole for assembling a dipstick.





Standard Elements	Main dimensions									⚖
Description	d1	d2	d3	d4	l1	l2	t	s	e ≈	g
GN 742-19-M14x1.5-OS-*	19	M14x1.5	2	M5	15.5	8	8	15	17.3	7
GN 742-19-M14x1.5-ES-*	19	M14x1.5	2	M5	15.5	8	8	15	17.3	17
GN 742-19-M14x1.5-AS-*	19	M14x1.5	2	M5	15.5	8	8	15	17.3	7
GN 742-22-M16x1.5-OS-*	22	M16x1.5	2	M5	15.5	8	8	18	20.8	10
GN 742-22-M16x1.5-ES-*	22	M16x1.5	2	M5	15.5	8	8	18	20.8	10
GN 742-22-M16x1.5-AS-*	22	M16x1.5	2	M5	15.5	8	8	18	20.8	10
GN 742-26-M20x1.5-OS-*	26	M20x1.5	2	M5	16	8.5	8	21	24.3	15
GN 742-26-M20x1.5-ES-*	26	M20x1.5	2	M5	16	8.5	8	21	24.3	15
GN 742-26-M20x1.5-AS-*	26	M20x1.5	2	M5	16	8.5	8	21	24.3	15
GN 742-32-M26x1.5-OS-*	32	M26x1.5	2	M5	17	9	8	27	31.2	26
GN 742-32-M26x1.5-ES-*	32	M26x1.5	2	M5	17	9	8	27	31.2	26
GN 742-32-M26x1.5-AS-*	32	M26x1.5	2	M5	17	9	8	27	31.2	26
GN 742-32-M27x1.5-OS-*	32	M27x1.5	2	M5	17	9	8	27	31.2	26
GN 742-32-M27x1.5-ES-*	32	M27x1.5	2	M5	17	9	8	27	31.2	26
GN 742-32-M27x1.5-AS-*	32	M27x1.5	2	M5	17	9	8	27	31.2	26
GN 742-40-M33x1.5-OS-*	40	M33x1.5	2	M5	19.5	11	8	32	37	47
GN 742-40-M33x1.5-ES-*	40	M33x1.5	2	M5	19.5	11	8	32	37	47
GN 742-40-M33x1.5-AS-*	40	M33x1.5	2	M5	19.5	11	8	32	37	47
GN 742-50-M40x1.5-OS-*	50	M40x1.5	2	M5	21	12	8	41	47.3	80
GN 742-50-M40x1.5-ES-*	50	M40x1.5	2	M5	21	12	8	41	47.3	80
GN 742-50-M40x1.5-AS-*	50	M40x1.5	2	M5	21	12	8	41	47.3	80
GN 742-50-M42x1.5-OS-*	50	M42x1.5	2	M5	21	12	8	41	47.3	80
GN 742-50-M42x1.5-ES-*	50	M42x1.5	2	M5	21	12	8	41	47.3	80
GN 742-50-M42x1.5-AS-*	50	M42x1.5	2	M5	21	12	8	41	47.3	80

Standard Elements	Main dimensions									⚖
Description	d1	d2	d3	d4	l1	l2	t	s	e ≈	g
GN 742-50-M42x2-OS-*	50	M42x2	2	M5	21	12	8	41	47.3	80
GN 742-50-M42x2-ES-*	50	M42x2	2	M5	21	12	8	41	47.3	80
GN 742-50-M42x2-AS-*	50	M42x2	2	M5	21	12	8	41	47.3	80
GN 742-19-G1/4-OS-*	19	G1/4	2	M5	15.5	8	8	15	17.3	7
GN 742-19-G1/4-ES-*	19	G1/4	2	M5	15.5	8	8	15	17.3	7
GN 742-19-G1/4-AS-*	19	G1/4	2	M5	15.5	8	8	15	17.3	7
GN 742-22-G3/8-OS-*	22	G3/8	2	M5	15.5	8	8	18	20.8	10
GN 742-22-G3/8-ES-*	22	G3/8	2	M5	15.5	8	8	18	20.8	10
GN 742-22-G3/8-AS-*	22	G3/8	2	M5	15.5	8	8	18	20.8	10
GN 742-26-G1/2-OS-*	26	G1/2	2	M5	16	8.5	8	21	24.3	15
GN 742-26-G1/2-ES-*	26	G1/2	2	M5	16	8.5	8	21	24.3	15
GN 742-26-G1/2-AS-*	26	G1/2	2	M5	16	8.5	8	21	24.3	15
GN 742-32-G3/4-OS-*	32	G3/4	2	M5	17	9	8	27	31.2	26
GN 742-32-G3/4-ES-*	32	G3/4	2	M5	17	9	8	27	31.2	26
GN 742-32-G3/4-AS-*	32	G3/4	2	M5	17	9	8	27	31.2	26
GN 742-40-G1-OS-*	40	G1	2	M5	19.5	11	8	32	37	47
GN 742-40-G1-ES-*	40	G1	2	M5	19.5	11	8	32	37	47
GN 742-40-G1-AS-*	40	G1	2	M5	19.5	11	8	32	37	47
GN 742-50-G1 1/4-OS-*	50	G1 1/4	2	M5	21	12	8	41	47.3	80
GN 742-50-G1 1/4-ES-*	50	G1 1/4	2	M5	21	12	8	41	47.3	80
GN 742-50-G1 1/4-AS-*	50	G1 1/4	2	M5	21	12	8	41	47.3	80
GN 742-60-G1 1/2-OS-*	60	G1 1/2	2	M5	22	13	8	50	57.7	120
GN 742-60-G1 1/2-ES-*	60	G1 1/2	2	M5	22	13	8	50	57.7	120
GN 742-60-G1 1/2-AS-*	60	G1 1/2	2	M5	22	13	8	50	57.7	120

*Complete the description of the standard item needed by adding 1 (without vent drilling) or 2 (with vent drilling).

TMB.

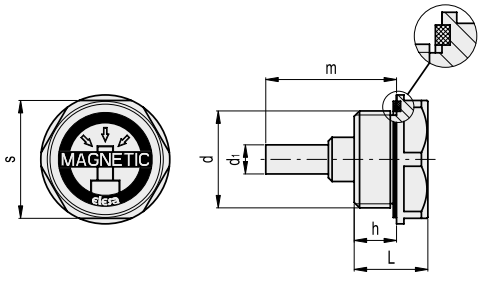
Magnetic plugs

RoHS AN +100°C -20°C +180°C -20°C

- **Material**
  Black anodised aluminium.
  Marked "MAGNETIC" and graphic symbol, laser engraved.
- **Permanent magnetic element**
  (AlNiCo) Aluminium-nickel-cobalt with a high attractive power, to keep metal particles in oil.
- **Standard executions**
  - **TMB**: NBR synthetic rubber flat packing ring.
    Max working temperature 100°C.
  - **TMB-HT**: FKM synthetic rubber flat packing ring.
    Max working temperature 180°C.

Technical data

The positioning of the packing ring in its housing guarantees a high tightening torque, therefore the plug can be used even in pressurised reservoirs.



Standard Elements		Main dimensions						⚖
Code	Description	d	h	s	L	d1	m	g
59701	TMB.M14x1,5	M14x1.5	9	19	16.5	6	30	14
59703	TMB.M16x1,5	M16x1.5	9	22	16.5	8	31	22
59705	TMB.M20x1,5	M20x1.5	11	24	18.5	8	34	28
59707	TMB.M26x1,5	M26x1.5	11.5	32	20	8	35.5	45
59709	TMB.M27x1,5	M27x1.5	11.5	32	20	8	35.5	46
59711	TMB.M33x1,5	M33x1.5	11.5	38	20	8	35.5	65
59713	TMB.M40x1,5	M40x1.5	13	46	24	8	37	107
59715	TMB.M42x1,5	M42x1.5	13	46	24	8	37	110
59717	TMB.M42x2	M42x2	13	46	24	8	37	113
59721	TMB.1/4	G 1/4	9	19	16.5	6	30	14
59723	TMB.3/8	G 3/8	9	22	16.5	8	31	22
59725	TMB.1/2	G 1/2	11	24	18.5	8	34	28
59727	TMB.3/4	G 3/4	11.5	32	20	8	35.5	45
59729	TMB.1	G 1	11.5	38	20	8	35.5	65
59731	TMB.1 1/4	G 1 1/4	13	46	24	8	37	107
59733	TMB.1 1/2	G 1 1/2	13	50	24	8	37	131
59751	TMB-HT.M14x1,5	M14x1.5	9	19	16.5	6	30	14
59753	TMB-HT.M16x1,5	M16x1.5	9	22	16.5	8	31	22
59755	TMB-HT.M20x1,5	M20x1.5	11	24	18.5	8	34	28
59757	TMB-HT.M26x1,5	M26x1.5	11.5	32	20	8	35.5	45
59759	TMB-HT.M27x1,5	M27x1.5	11.5	32	20	8	35.5	46
59761	TMB-HT.M33x1,5	M33x1.5	11.5	38	20	8	35.5	65
59763	TMB-HT.M40x1,5	M40x1.5	13	46	24	8	37	107
59765	TMB-HT.M42x1,5	M42x1.5	13	46	24	8	37	110
59767	TMB-HT.M42x2	M42x2	13	46	24	8	37	113
59771	TMB-HT.1/4	G 1/4	9	19	16.5	6	30	14
59773	TMB-HT.3/8	G 3/8	9	22	16.5	8	31	22
59775	TMB-HT.1/2	G 1/2	11	24	18.5	8	34	28
59777	TMB-HT.3/4	G 3/4	11.5	32	20	8	35.5	45
59779	TMB-HT.1	G 1	11.5	38	20	8	35.5	65
59781	TMB-HT.1 1/4	G 1 1/4	13	46	24	8	37	107
59783	TMB-HT.1 1/2	G 1 1/2	13	50	24	8	37	131

TCE.

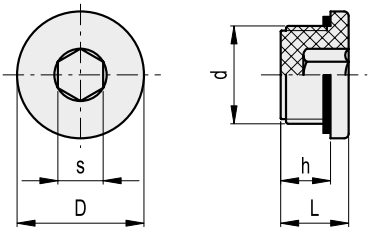
ELESA Original design

Plugs with hexagon socket

- **Material**
  Glass-fibre reinforced polyamide based (PA) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
- **Colour**
  Black, matte finish.
- **Flat packing ring**
  NBR synthetic rubber.
- **Maximum continuous working temperature**
  100°C.

Technical data

An adequate tightening torque (see table below) is recommended when screwing the plug, so as to guarantee optimal tightness without any deformation of the packing ring. Suggested tightening torque is the result of laboratory tests carried out at ambient temperature (23°C) with plug, packing ring and reservoir walls perfectly cleaned.



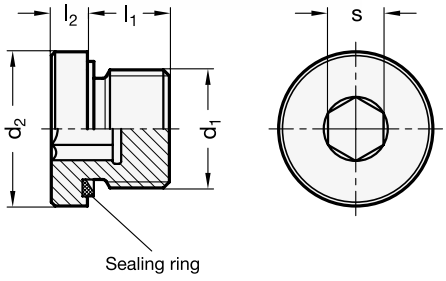
Standard Elements		Main dimensions					Tightening torque	⚖
Code	Description	d	h	s	L	D	[Nm]	g
161033	TCE.1/4	G 1/4	9	6	12	20	3	4
161034	TCE.3/8	G 3/8	9	8	13	22	3÷5	5
161035	TCE.1/2	G 1/2	11	10	15	28	3÷4	8
161036	TCE.3/4	G 3/4	12	12	16.5	32	3÷5	14

GN 749

Plugs with hexagon socket for high pressures

RoHS +180°C -30°C +100°C -30°C

- **Material**
  Zinc-plated nano-passivated (silver/yellowish) steel (class 5.8 - tensile strength 500 N/mm²), blue passivated. Ultrasonically and tensile tested.
- **Flat packing ring**
  - Version **A**: NBR synthetic rubber.
  - Version **B**: FPM synthetic rubber (type VITON®, registered mark by DuPont Dow Elastomers). Identification by not black finish.
- **Maximum continuous working temperature**
  - Version **A**: 100°C.
  - Version **B**: 180°C.



Standard Elements	Main dimensions						Maximum working pressure in bar	Tightening torque in Nm	⚖
Description	d1	d2	d3	l1	l2	s			g
GN 749-M8x1-A	M8x1	12	9.9	8	4	4	400	8	5
GN 749-M10x1-A	M10x1	14	11.9	8	4	5	400	12	5
GN 749-M12x1.5-A	M12x1.5	17	14.4	12	5	6	400	25	15
GN 749-M14x1.5-A	M14x1.5	19	16.5	12	5	6	400	30	20
GN 749-M16x1.5-A	M16x1.5	22	18.9	12	5	8	400	50	25
GN 749-M18x1.5-A	M18x1.5	24	20.9	12	5	8	400	60	30
GN 749-M20x1.5-A	M20x1.5	26	22.9	14	5	10	400	70	42
GN 749-M22x1.5-A	M22x1.5	27	24.3	14	5	10	400	80	50
GN 749-M24x1.5-A	M24x1.5	30	26.9	14	5	12	400	95	56
GN 749-M26x1.5-A	M26x1.5	32	29.2	16	5	12	400	120	75
GN 749-M27x2-A	M27x2	32	29.2	16	5	12	400	120	80
GN 749-M30x1.5-A	M30x1.5	37	32.7	16	6.5	17	400	190	103
GN 749-M33x2-A	M33x2	40	35.7	16	6.5	17	400	225	125
GN 749-M42x2-A	M42x2	50	45.8	16	6.5	22	315	360	201
GN 749-M48x2-A	M48x2	55	50.7	16	6.5	24	315	400	254
GN 749-G1/8-A	G1/8	14	11.9	8	4	5	400	12	5
GN 749-G1/4-A	G1/4	19	16.5	12	5	6	400	30	15
GN 749-G3/8-A	G3/8	22	18.9	12	5	8	400	50	25
GN 749-G1/2-A	G1/2	27	23.9	14	5	10	400	80	45
GN 749-G3/4-A	G3/4	32	29.2	16	5	12	400	120	75
GN 749-G1-A	G1	40	35.7	16	6.5	17	400	225	124
GN 749-G1¼-A	G1¼	50	45.8	16	6.5	22	315	360	195
GN 749-G1½-A	G1½	55	50.7	16	6.5	24	315	400	240
GN 749-M8x1-B	M8x1	12	9.9	8	4	4	400	8	5
GN 749-M10x1-B	M10x1	14	11.9	8	4	5	400	12	5
GN 749-M12x1.5-B	M12x1.5	17	14.4	12	5	6	400	25	15
GN 749-M14x1.5-B	M14x1.5	19	16.5	12	5	6	400	30	20
GN 749-M16x1.5-B	M16x1.5	22	18.9	12	5	8	400	50	25
GN 749-M18x1.5-B	M18x1.5	24	20.9	12	5	8	400	60	30
GN 749-M20x1.5-B	M20x1.5	26	22.9	14	5	10	400	70	42
GN 749-M22x1.5-B	M22x1.5	27	24.3	14	5	10	400	80	50
GN 749-M24x1.5-B	M24x1.5	30	26.9	14	5	12	400	95	56
GN 749-M26x1.5-B	M26x1.5	32	29.2	16	5	12	400	120	75
GN 749-M27x2-B	M27x2	32	29.2	16	5	12	400	120	80
GN 749-M30x1.5-B	M30x1.5	37	32.7	16	6.5	17	400	190	103
GN 749-M33x2-B	M33x2	40	35.7	16	6.5	17	400	225	125
GN 749-M42x2-B	M42x2	50	45.8	16	6.5	22	315	360	201
GN 749-M48x2-B	M48x2	55	50.7	16	6.5	24	315	400	254
GN 749-G1/8-B	G1/8	14	11.9	8	4	5	400	12	5
GN 749-G1/4-B	G1/4	19	16.5	12	5	6	400	30	15
GN 749-G3/8-B	G3/8	22	18.9	12	5	8	400	50	25
GN 749-G1/2-B	G1/2	27	23.9	14	5	10	400	80	45
GN 749-G3/4-B	G3/4	32	29.2	16	5	12	400	120	75
GN 749-G1-B	G1	40	35.7	16	6.5	17	400	225	124
GN 749-G1¼-B	G1¼	50	45.8	16	6.5	22	315	360	195
GN 749-G1½-B	G1½	55	50.7	16	6.5	24	315	400	240

DIN 908

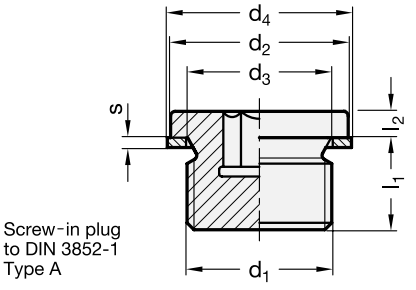
Threaded plugs

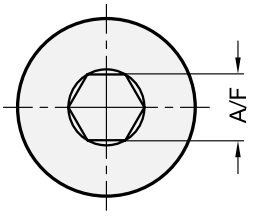
RoHS

- **Specification**
  Steel **ST**
  - Tensile strength class 5.8 (500 N/mm²)
  - ultrasonically and tensile tested
  - zinc plated, nano-passivated (silver / yellowish)

  Type
  - Type **A**: without gasket
  - Type **AC**: with gasket in copper
  - Type **AA**: with gasket in aluminium

Information
The gaskets in types AC and AA correspond to the gaskets DIN 7603, type A (flat gaskets).





Standard Elements	Main dimensions								⚖
Description	d1	d2 h14	d3	d4	l1 ±0.2	l2 +0.5	s	A/F	g
DIN 908-ST-M8x1-A	M8x1	12	8.3	11.5	8	3	1	4	4
DIN 908-ST-M10x1-A	M10x1	14	10.3	13.5	8	3	1	5	6
DIN 908-ST-M12x1.5-A	M12x1.5	17	12.3	16	12	3	1.5	6	11
DIN 908-ST-M14x1.5-A	M14x1.5	19	14.3	18	12	3	1.5	6	16
DIN 908-ST-M16x1.5-A	M16x1.5	21	16.3	20	12	3	1.5	6	20
DIN 908-ST-M18x1.5-A	M18x1.5	23	18.3	22	12	4	1.5	8	38
DIN 908-ST-M20x1.5-A	M20x1.5	25	20.3	24	14	4	1.5	10	38
DIN 908-ST-M22x1.5-A	M22x1.5	27	22.3	27	14	4	1.5	10	53
DIN 908-ST-M24x1.5-A	M24x1.5	29	24.3	29	14	4	2	12	64
DIN 908-ST-M26x1.5-A	M26x1.5	31	26.3	31	16	4	2	12	73
DIN 908-ST-M27x2-A	M27x2	32	27.3	32	16	4	2	12	75
DIN 908-ST-M30x1.5-A	M30x1.5	36	30.3	36	16	4	2	17	84
DIN 908-ST-M33x2-A	M33x2	39	33.3	39	16	5	2	17	119
DIN 908-ST-M42x2-A	M42x2	49	42.3	49	16	5	2	22	187
DIN 908-ST-M48x2-A	M 48x2	55	48.3	55	16	5	2	24	240

Standard Elements	Main dimensions								⚖
Description	d1	d2 h14	d3	d4	l1 ±0.2	l2 +0.5	s	A/F	g
DIN 908-ST-M8x1-AC	M8x1	12	8.3	11.5	8	3	1	4	6
DIN 908-ST-M10x1-AC	M10x1	14	10.3	13.5	8	3	1	5	10
DIN 908-ST-M12x1.5-AC	M12x1.5	17	12.3	16	12	3	1.5	6	15
DIN 908-ST-M14x1.5-AC	M14x1.5	19	14.3	18	12	3	1.5	6	20
DIN 908-ST-M16x1.5-AC	M16x1.5	21	16.3	20	12	3	1.5	8	25
DIN 908-ST-M18x1.5-AC	M18x1.5	23	18.3	22	12	4	1.5	8	30
DIN 908-ST-M20x1.5-AC	M20x1.5	25	20.3	24	14	4	1.5	10	40
DIN 908-ST-M22x1.5-AC	M22x1.5	27	22.3	27	14	4	1.5	10	52
DIN 908-ST-M24x1.5-AC	M24x1.5	29	24.3	29	14	4	2	12	60
DIN 908-ST-M26x1.5-AC	M26x1.5	31	26.3	31	16	4	2	12	80
DIN 908-ST-M27x2-AC	M27x2	32	27.3	32	16	4	2	12	92
DIN 908-ST-M30x1.5-AC	M30x1.5	36	30.3	36	16	4	2	17	111
DIN 908-ST-M33x2-AC	M33x2	39	33.3	39	16	5	2	17	120
DIN 908-ST-M42x2-AC	M42x2	49	42.3	49	16	5	2	22	180
DIN 908-ST-M48x2-AC	M 48x2	55	48.1	55	16	5	2	24	240
DIN 908-ST-M8x1-AA	M8x1	12	8.3	11.5	8	3	1	4	5
DIN 908-ST-M10x1-AA	M10x1	14	10.3	13.5	8	3	1	5	7
DIN 908-ST-M12x1.5-AA	M12x1.5	17	12.3	16	12	3	1.5	6	10
DIN 908-ST-M14x1.5-AA	M14x1.5	19	14.3	18	12	3	1.5	6	20
DIN 908-ST-M16x1.5-AA	M16x1.5	21	16.3	20	12	3	1.5	8	27
DIN 908-ST-M18x1.5-AA	M18x1.5	23	18.3	22	12	4	1.5	8	35
DIN 908-ST-M20x1.5-AA	M20x1.5	25	20.3	24	14	4	1.5	10	40
DIN 908-ST-M22x1.5-AA	M22x1.5	27	22.3	27	14	4	1.5	10	50
DIN 908-ST-M24x1.5-AA	M24x1.5	29	24.3	29	14	4	2	12	60
DIN 908-ST-M26x1.5-AA	M26x1.5	31	26.3	31	16	4	2	12	70
DIN 908-ST-M27x2-AA	M27x2	32	27.3	32	16	4	2	12	73
DIN 908-ST-M30x1.5-AA	M30x1.5	36	30.3	36	16	4	2	17	80
DIN 908-ST-M33x2-AA	M33x2	39	33.3	39	16	5	2	17	100
DIN 908-ST-M42x2-AA	M42x2	49	42.3	49	16	5	2	22	190
DIN 908-ST-M48x2-AA	M48x2	55	48.3	55	16	5	2	24	240
DIN 908-ST-G1/8-A	G1/8	14	10	13.5	8	3	1	6	6
DIN 908-ST-G1/4-A	G1/4	18	13.4	18	12	3	1.5	6	14
DIN 908-ST-G3/8-A	G3/8	22	17	21	12	3	1.5	8	22
DIN 908-ST-G1/2-A	G1/2	26	21.3	26	14	4	1.5	10	41
DIN 908-ST-G3/4-A	G3/4	32	26.7	32	16	4	2	12	53
DIN 908-ST-G1-A	G1	39	33.5	39	16	5	2	17	119
DIN 908-ST-G1 1/4-A	G1 1/4	49	42.2	49	16	5	2	22	185
DIN 908-ST-G1 1/2-A	G1 1/2	55	48.1	55	16	5	2	24	237
DIN 908-ST-G1/8-AC	G1/8	14	10	13.5	8	3	1	6	10
DIN 908-ST-G1/4-AC	G1/4	18	13.4	18	12	3	1.5	6	15
DIN 908-ST-G3/8-AC	G3/8	22	17	21	12	3	1.5	8	25
DIN 908-ST-G1/2-AC	G1/2	26	21.3	26	14	4	1.5	10	42
DIN 908-ST-G3/4-AC	G3/4	32	26.7	32	16	4	2	12	70
DIN 908-ST-G1-AC	G1	39	33.5	39	16	5	2	17	130
DIN 908-ST-G1 1/4-AC	G 1 1/4	49	42.2	49	16	5	2	22	180
DIN 908-ST-G1 1/2-AC	G 1 1/2	55	48.1	55	16	5	2	24	240
DIN 908-ST-G1/8-AA	G1/8	14	10	13.5	8	3	1	6	5
DIN 908-ST-G1/4-AA	G1/4	18	13.4	18	12	3	1.5	6	18
DIN 908-ST-G3/8-AA	G3/8	22	17	21	12	3	1.5	8	25
DIN 908-ST-G1/2-AA	G1/2	26	21.3	26	14	4	1.5	10	40
DIN 908-ST-G3/4-AA	G3/4	32	26.7	32	16	4	2	12	80
DIN 908-ST-G1-AA	G1	39	33.5	39	16	5	2	17	120
DIN 908-ST-G1 1/4-AA	G1 1/4	49	42.2	49	16	5	2	22	180
DIN 908-ST-G1 1/2-AA	G 1 1/2	55	48.1	55	16	5	2	24	240

DIN 7603

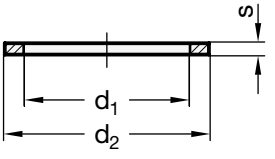
Gaskets

RoHS

- **Material**
  - Version **CU**: Cupper.
  - Version **AL**: Aluminium.
- **Standard versions available**
  Type **A**: Flat gasket.

Special executions on request *(For sufficient quantities)*
Other sizes, materials or types.

Features and applications
The gaskets listed in this standard sheets are only an extract of DIN 7603.They are used in connections with threaded plugs DIN 908.



Standard Elements	Main dimensions					suitable DIN 908		⚖
Description	d1	d1 +0.3	d2	d2 -0.2	s ±0.2			g
DIN 7603-CU-8-11.5-A	8	8.2	11.5	11.4	1	M8x1	-	1
DIN 7603-CU-10-13.5-A	10	10.2	13.5	13.4	1	M10x1	G1/8	1
DIN 7603-CU-12-16-A	12	12.2	16	15.9	1.5	M12x1.5	-	1
DIN 7603-CU-14-18-A	14	14.2	18	17.9	1.5	M14x1.5	G1/4	1
DIN 7603-CU-16-20-A	16	16.2	20	19.9	1.5	M16x1.5	-	1
DIN 7603-CU-17-21-A	17	17.2	21	20.9	1.5	-	G3/8	1
DIN 7603-CU-18-22-A	18	18.2	22	21.9	1.5	M18x1.5	-	1
DIN 7603-CU-20-24-A	20	20.2	24	23.9	1.5	M20x1.5	-	2
DIN 7603-CU-21-26-A	21	21.2	26	25.9	1.5	-	G1/2	2
DIN 7603-CU-22-27-A	22	22.2	27	26.9	1.5	M22x1.5	-	2
DIN 7603-CU-24-29-A	24	24.3	29	28.9	2	M24x1.5	-	3
DIN 7603-CU-26-31-A	26	26.3	31	30.9	2	M26x1.5	-	3
DIN 7603-CU-27-32-A	27	27.3	32	31.9	2	M27x2	G3/4	3
DIN 7603-CU-30-36-A	30	30.3	36	35.9	2	M30x1.5	-	4
DIN 7603-CU-33-39-A	33	33.3	39	38.9	2	M33x2	G1	5
DIN 7603-CU-42-49-A	42	42.3	49	48.9	2	M42x2	G1 1/4	7
DIN 7603-CU-48-55-A	48	48.3	55	54.9	2	M48x2	G1 1/2	8
DIN 7603-AL-8-11.5-A	8	8.2	11.5	11.4	1	M8x1	-	1
DIN 7603-AL-10-13.5-A	10	10.2	13.5	13.4	1	M10x1	G1/8	1
DIN 7603-AL-12-16-A	12	12.2	16	15.9	1.5	M12x1.5	-	1
DIN 7603-AL-14-18-A	14	14.2	18	17.9	1.5	M14x1.5	G1/4	1
DIN 7603-AL-16-20-A	16	16.2	20	19.9	1.5	M16x1.5	-	1
DIN 7603-AL-17-21-A	17	17.2	21	20.9	1.5	-	G3/8	1
DIN 7603-AL-18-22-A	18	18.2	22	21.9	1.5	M18x1.5	-	1
DIN 7603-AL-20-24-A	20	20.2	24	23.9	1.5	M20x1.5	-	2
DIN 7603-AL-21-26-A	21	21.2	26	25.9	1.5	-	G1/2	2
DIN 7603-AL-22-27-A	22	22.2	27	26.9	1.5	M22x1.5	-	2
DIN 7603-AL-24-29-A	24	24.3	29	28.9	2	M24x1.5	-	3
DIN 7603-AL-26-31-A	26	26.3	31	30.9	2	M26x1.5	-	3
DIN 7603-AL-27-32-A	27	27.3	32	31.9	2	M27x2	G3/4	3
DIN 7603-AL-30-36-A	30	30.3	36	35.9	2	M30x1.5	-	4
DIN 7603-AL-33-39-A	33	33.3	39	38.9	2	M33x2	G1	5
DIN 7603-AL-42-49-A	42	42.3	49	48.9	2	M42x2	G1 1/4	7
DIN 7603-AL-48-55-A	48	48.3	55	54.9	2	M48x2	G1 1/2	8

GN 7490

Welding sockets

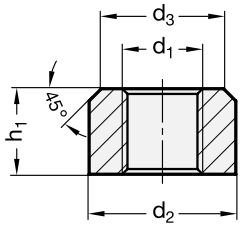
RoHS

- **Material**
  Steel, turned, blank, weldable.
- **Standard versions available**
  - Type **A**: with champfer.
  - Type **B**: with collar.

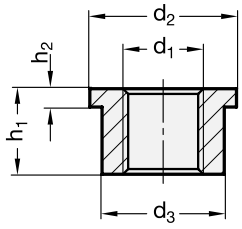
Special executions on request *(For sufficient quantities)*
- Welding sockets in Stainless Steel
- metric threads

Features and applications
Welding sockets GN 7490 are used in container construction or in hydraulics for mounting instruments such as oil level sight glasses or locking caps.
The plane surfaces are machined, with the effect that they can be used as sealing surface in connection with a sealing element or compund.
The favourably dimensioned wall thickness prevents deformation or burn-throught during welding.
Type B is used if exact positioning through the mounting borfe or a low construction height is required.

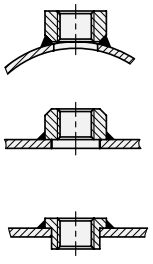
Type **A**



Type **B**



Example of application



Standard Elements	Main Dimensions					⚖
Description	**d1**	**d2**	**d3**	**h1**	**h2**	**g**
GN 7490-ST-G1/8-A	G1/8	20	16	10	3	18
GN 7490-ST-G1/4-A	G1/4	24	20	14	3	35
GN 7490-ST-G3/8-A	G3/8	28	22	14	4.5	42
GN 7490-ST-G1/2-A	G1/2	32	26	16	4.5	57
GN 7490-ST-G3/4-A	G3/4	40	32	18	6	97
GN 7490-ST-G1-A	G1	50	40	20	7.5	165
GN 7490-ST-G11/4-A	G11/4	60	50	22	7.5	244
GN 7490-ST-G11/2-A	G11/2	65	55	24	7.5	282
GN 7490-ST-G1/8-B	G1/8	20	16	10	3	13
GN 7490-ST-G1/4-B	G1/4	24	20	14	3	24
GN 7490-ST-G3/8-B	G3/8	28	22	14	4.5	28
GN 7490-ST-G1/2-B	G1/2	32	26	16	4.5	36
GN 7490-ST-G1-B	G1	50	40	20	7.5	111
GN 7490-ST-G3/4-B	G3/4	40	32	18	6	61
GN 7490-ST-G11/4-B	G11/4	60	50	22	7.5	162
GN 7490-ST-G11/2-B	G11/2	65	55	24	7.5	177

DIN 906

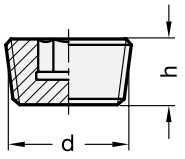
Threaded plugs

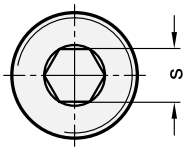
RoHS

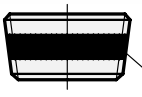
- **Material**
  Steel, blue passivated.
  Ultrasonically checked.
- **Standard versions available**
  - Version **A**: without micro encapsulation.
  - Version **GPC**: with micro encapsulation.

Special executions on request
Threaded plugs DIN 906-NI in AISI 303 stainless steel.

Features and applications
Threaded plugs DIN 906 are used to close bore holes with cylindrical internal thread.
The tightness depends on the medium, pressure, temperature and material pairing. The design with GPC thread coating provides a higher degree of safety.
The official DIN 906 standard sheet also provides for thread sizes M39x2; M52x1.5; M52x2; M56x2 and M60x2.







Pressure tightness with thread coating **GPC** (Precote 5)

Standard Elements	Main dimensions			⚖
Description	**d**	**h**	**s**	**g**
DIN 906-ST-M8x1-A	M8x1	8	4	2
DIN 906-ST-M10x1-A	M10x1	8	5	3
DIN 906-ST-M12x1.5-A	M12x1.5	10	6	6
DIN 906-ST-M14x1.5-A	M14x1.5	10	7	8
DIN 906-ST-M16x1.5-A	M16x1.5	10	8	10
DIN 906-ST-M18x1.5-A	M18x1.5	10	8	14
DIN 906-ST-M20x1.5-A	M20x1.5	10	10	17
DIN 906-ST-M22x1.5-A	M22x1.5	10	10	22
DIN 906-ST-M24x1.5-A	M24x1.5	12	12	30
DIN 906-ST-M26x1.5-A	M26x1.5	12	12	37
DIN 906-ST-M27x2-A*	M27x2	12	12	40
DIN 906-ST-M30x1.5-A	M30x1.5	12	17	45
DIN 906-ST-M33x2-A*	M33x2	12	17	50
DIN 906-ST-M36x1.5-A	M36x1.5	15	19	86
DIN 906-ST-M36x2-A*	M36x2	15	19	90
DIN 906-ST-M38x1.5-A*	M38x1.5	15	19	100
DIN 906-ST-M42x1.5-A	M42x1.5	18	22	142
DIN 906-ST-M42x2-A	M42x2	18	22	-
DIN 906-ST-M45x1.5-A	M45x1.5	18	22	163
DIN 906-ST-M45x2-A*	M45x2	18	22	160
DIN 906-ST-M48x1.5-A	M48x1.5	20	24	210
DIN 906-ST-M48x2-A*	M48x2	20	24	230
DIN 906-ST-R1/8-A	R1/8	8	5	3
DIN 906-ST-R1/4-A	R1/4	10	7	7
DIN 906-ST-R3/8-A	R3/8	10	8	12
DIN 906-ST-R1/2-A	R1/2	10	10	19
DIN 906-ST-R3/4-A	R3/4	12	12	37
DIN 906-ST-R1-A	R1	12	17	57

Standard Elements	Main dimensions			⚖
Description	**d**	**h**	**s**	**g**
DIN 906-ST-M8x1-GPC	M8x1	8	4	2
DIN 906-ST-M10x1-GPC	M10x1	8	5	3
DIN 906-ST-M12x1.5-GPC	M12x1.5	10	6	6
DIN 906-ST-M14x1.5-GPC	M14x1.5	10	7	8
DIN 906-ST-M16x1.5-GPC	M16x1.5	10	8	10
DIN 906-ST-M18x1.5-GPC	M18x1.5	10	8	15
DIN 906-ST-M20x1.5-GPC	M20x1.5	10	10	17
DIN 906-ST-M22x1.5-GPC	M22x1.5	10	10	22
DIN 906-ST-M24x1.5-GPC	M24x1.5	12	12	30
DIN 906-ST-M26x1.5-GPC	M26x1.5	12	12	37
DIN 906-ST-M27x2-GPC*	M27x2	12	12	40
DIN 906-ST-M30x1.5-GPC	M30x1.5	12	17	44
DIN 906-ST-M33x2-GPC*	M33x2	12	17	60
DIN 906-ST-M36x1.5-GPC	M36x1.5	15	19	86
DIN 906-ST-M36x2-GPC*	M36x2	15	19	90
DIN 906-ST-M38x1.5-GPC*	M38x1.5	15	19	110
DIN 906-ST-M42x1.5-GPC	M42x1.5	18	22	143
DIN 906-ST-M42x2-GPC*	M42x2	18	22	140
DIN 906-ST-M45x1.5-GPC	M45x1.5	18	22	165
DIN 906-ST-M45x2-GPC*	M45x2	18	22	180
DIN 906-ST-M48x1.5-GPC	M48x1.5	20	24	209
DIN 906-ST-M48x2-GPC*	M48x2	20	24	230
DIN 906-ST-R1/8-GPC	R1/8	8	5	3
DIN 906-ST-R1/4-GPC	R1/4	10	7	7
DIN 906-ST-R3/8-GPC	R3/8	10	8	12
DIN 906-ST-R1/2-GPC	R1/2	10	10	20
DIN 906-ST-R3/4-GPC	R3/4	12	12	37
DIN 906-ST-R1-GPC	R1	12	17	57

* For sufficient quantities.

DIN 906-NI

INOX Stainless Steel

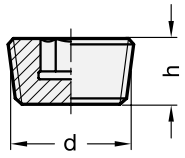
Threaded plugs

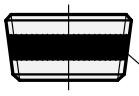
RoHS

- **Material**
  AISI 303 Stainless Steel.
- **Standard versions available**
  - Version **A**: without micro encapsulation.
  - Version **GPC**: with micro encapsulation.

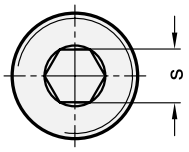
Special executions on request
Threaded plugs DIN 906-NI in AISI 303 stainless steel.

Features and applications
Threaded plugs DIN 906 are used to close bore holes with cylindrical internal thread.
The tightness depends on the medium, pressure, temperature and material pairing. The design with GPC thread coating provides a higher degree of safety.
The official DIN 906 standard sheet also provides for thread sizes M39x2; M52x1.5; M52x2; M56x2 and M60x2.





Pressure tightness with thread coating **GPC** (Precote 5)



Standard Elements	Main dimensions			⚖
Description	**d**	**h**	**s**	**g**
DIN 906-NI-M8x1-A	M8x1	8	4	2
DIN 906-NI-M10x1-A	M10x1	8	5	3
DIN 906-NI-M12x1.5-A	M12x1.5	10	6	6
DIN 906-NI-M14x1.5-A	M14x1.5	10	7	8
DIN 906-NI-M16x1.5-A	M16x1.5	10	8	10
DIN 906-NI-M18x1.5-A	M18x1.5	10	8	14
DIN 906-NI-M20x1.5-A	M20x1.5	10	10	17
DIN 906-NI-M22x1.5-A	M22x1.5	10	10	22
DIN 906-NI-M24x1.5-A	M24x1.5	12	12	30
DIN 906-NI-R1/8-A	R1/8	8	5	3
DIN 906-NI-R1/4-A	R1/4	10	7	7
DIN 906-NI-R3/8-A	R3/8	10	8	12
DIN 906-NI-R1/2-A	R1/2	10	10	19
DIN 906-NI-R3/4-A	R3/4	12	12	37
DIN 906-NI-R1-A	R1	12	17	57
DIN 906-NI-M8x1-GPC	M8x1	8	4	2
DIN 906-NI-M10x1-GPC	M10x1	8	5	3
DIN 906-NI-M12x1.5-GPC	M12x1.5	10	6	6
DIN 906-NI-M14x1.5-GPC	M14x1.5	10	7	8
DIN 906-NI-M16x1.5-GPC	M16x1.5	10	8	10
DIN 906-NI-M18x1.5-GPC	M18x1.5	10	8	15
DIN 906-NI-M20x1.5-GPC	M20x1.5	10	10	17
DIN 906-NI-M22x1.5-GPC	M22x1.5	10	10	22
DIN 906-NI-M24x1.5-GPC	M24x1.5	12	12	30

GN 441

Plugs

RoHS

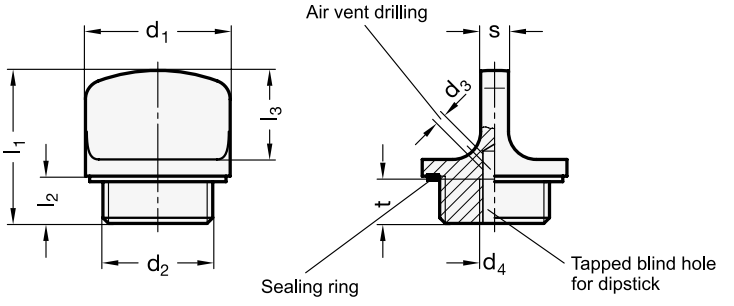
- **Material**
  Aluminium.
- **Finish**
  - Version **SW**: RAL 9005 black, matte finish, epoxy resin coating.
  - Version **BL**: blank, tumbled.
- **Flat packing ring**
  NBR (Perbunan) synthetic rubber.
- **Maximium continuous working temperature**
  100° C.
- **Standard versions available**
  - Identification no. **1**: without vent drilling.
  - Identification no. **2**: *with vent drilling.
  * usually not availble from stock, requires a minimum order quantity.

Features and applications

Threaded plugs GN 441 with the external diameter d1 match the screw-in holes for DIN 3852 pipe bolt connections.
The sealing ring is embedded in a radial recess on the plane side, which makes the sealing ring captive and cannot be squeezed out during tightening. The sealing is also relatively soft, enhancing the sealing effect also on uneven surfaces.

Special executions on request

(For sufficient quantities)
- Plugs with Ø 2 mm (d2) side breather hole (type 2 with vent drilling).
- Threaded plugs with dipstick.



Standard Elements	Main dimensions									⚖
Description	d1	d2	d3	d4	l1 ±0.5	l2	l3	s	tmin.	g
GN 441-22-G3/8-1-SW	22	G3/8	-	M5	26	8	15	5	8	12
GN 441-22-G3/8-1-BL	22	G3/8	-	M5	26	8	15	5	8	12
GN 441-22-G3/8-2-SW	22	G3/8	2	M5	26	8	15	5	8	12
GN 441-22-G3/8-2-BL	22	G3/8	2	M5	26	8	15	5	8	12
GN 441-22-M16x1.5-1-SW	22	M16x1.5	-	M5	26	8	15	5	8	12
GN 441-22-M16x1.5-1-BL	22	M16x1.5	-	M5	26	8	15	5	8	12
GN 441-22-M16x1.5-2-SW	22	M16x1.5	2	M5	26	8	15	5	8	12
GN 441-22-M16x1.5-2-BL	22	M16x1.5	2	M5	26	8	15	5	8	12
GN 441-26-G1/2-1-SW	26	G1/2	-	M5	27.5	8.5	16	5	8	17
GN 441-26-G1/2-1-BL	26	G1/2	-	M5	27.5	8.5	16	5	8	17
GN 441-26-G1/2-2-SW	26	G1/2	2	M5	27.5	8.5	16	5	8	17
GN 441-26-G1/2-2-BL	26	G1/2	2	M5	27.5	8.5	16	5	8	17
GN 441-26-M20x1.5-1-SW	26	M20x1.5	-	M5	27.5	8.5	16	5	8	17
GN 441-26-M20x1.5-1-BL	26	M20x1.5	-	M5	27.5	8.5	16	5	8	17
GN 441-26-M20x1.5-2-SW	26	M20x1.5	2	M5	27.5	8.5	16	5	8	17
GN 441-26-M20x1.5-2-BL	26	M20x1.5	2	M5	27.5	8.5	16	5	8	17
GN 441-32-G3/4-1-SW	32	G3/4	-	M5	29	9	17	6	8	27
GN 441-32-G3/4-1-BL	32	G3/4	-	M5	29	9	17	6	8	27
GN 441-32-G3/4-2-SW	32	G3/4	2	M5	29	9	17	6	8	27
GN 441-32-G3/4-2-BL	32	G3/4	2	M5	29	9	17	6	8	27
GN 441-32-M26x1.5-1-SW	32	M26x1.5	-	M5	29	9	17	6	8	27
GN 441-32-M26x1.5-1-BL	32	M26x1.5	-	M5	29	9	17	6	8	27
GN 441-32-M26x1.5-2-SW	32	M26x1.5	2	M5	29	9	17	6	8	27
GN 441-32-M26x1.5-2-BL	32	M26x1.5	2	M5	29	9	17	6	8	27
GN 441-40-G1-1-SW	40	G1	-	M5	32.5	11	18	7	8	48
GN 441-40-G1-1-BL	40	G1	-	M5	32.5	11	18	7	8	48
GN 441-40-G1-2-SW	40	G1	2	M5	32.5	11	18	7	8	48
GN 441-40-G1-2-BL	40	G1	2	M5	32.5	11	18	7	8	48

GN 442

Plugs for application with high temperatures

RoHS

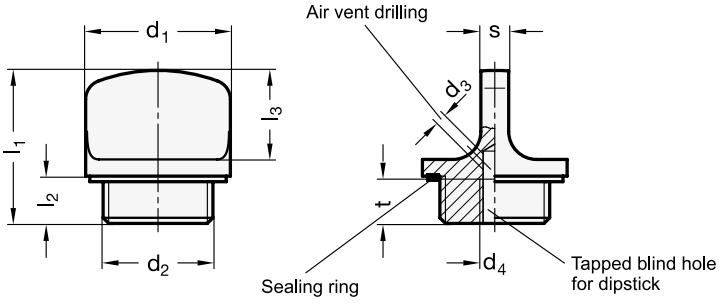
- **Material**
  Aluminium.
- **Finish**
  - Version **SW**: RAL 9005 black, matte finish, epoxy resin coating.
  - Version **BL**: blank, tumbled.
- **Flat packing ring**
  FPM (type VITON®) rubber.
- **Maximium continuous working temperature**
  200° C.
- **Vent drilling**
  - Identification no. **1**: without vent drilling.
  - Identification no. **2**: with vent drilling.

Features and applications

Threaded plugs GN 442 with the external diameter d1 match the screw-in holes for DIN 3852 pipe bolt connections.
The sealing ring is embedded in a radial recess on the plane side, which makes the sealing ring captive and cannot be squeezed out during tightening. The sealing is also relatively soft, enhancing the sealing effect also on uneven surfaces.

Special executions on request

(For sufficient quantities)
Threaded plugs with dipstick.



Standard Elements	Main dimensions									⚖
Description	d1	d2	d3 Vent drilling	d4	l1 ±0.5	l2	l3	s	tmin.	g
GN 442-22-G3/8-1-SW	22	G3/8	2	M5	26	8	15	5	8	12
GN 442-22-G3/8-1-BL	22	G3/8	2	M5	26	8	15	5	8	12
GN 442-22-G3/8-2-SW	22	G3/8	2	M5	26	8	15	5	8	12
GN 442-22-G3/8-2-BL	22	G3/8	2	M5	26	8	15	5	8	12
GN 442-22-M16x1.5-1-SW	22	M16x1.5	2	M5	26	8	15	5	8	12
GN 442-22-M16x1.5-1-BL	22	M16x1.5	2	M5	26	8	15	5	8	12
GN 442-22-M16x1.5-2-SW	22	M16x1.5	2	M5	26	8	15	5	8	12
GN 442-22-M16x1.5-2-BL	22	M16x1.5	2	M5	26	8	15	5	8	12
GN 442-26-G1/2-1-SW	26	G1/2	2	M5	27.5	8.5	16	5	8	17
GN 442-26-G1/2-1-BL	26	G1/2	2	M5	27.5	8.5	16	5	8	17
GN 442-26-G1/2-2-SW	26	G1/2	2	M5	27.5	8.5	16	5	8	17
GN 442-26-G1/2-2-BL	26	G1/2	2	M5	27.5	8.5	16	5	8	17
GN 442-26-M20x1.5-1-SW	26	M20x1.5	2	M5	27.5	8.5	16	5	8	17
GN 442-26-M20x1.5-1-BL	26	M20x1.5	2	M5	27.5	8.5	16	5	8	17
GN 442-26-M20x1.5-2-SW	26	M20x1.5	2	M5	27.5	8.5	16	5	8	17
GN 442-26-M20x1.5-2-BL	26	M20x1.5	2	M5	27.5	8.5	16	5	8	17
GN 442-32-G3/4-1-SW	32	G3/4	2	M5	29	9	17	6	8	27
GN 442-32-G3/4-1-BL	32	G3/4	2	M5	29	9	17	6	8	27
GN 442-32-G3/4-2-SW	32	G3/4	2	M5	29	9	17	6	8	27
GN 442-32-G3/4-2-BL	32	G3/4	2	M5	29	9	17	6	8	27
GN 442-32-M26x1.5-1-SW	32	M26x1.5	2	M5	29	9	17	6	8	27
GN 442-32-M26x1.5-1-BL	32	M26x1.5	2	M5	29	9	17	6	8	27
GN 442-32-M26x1.5-2-SW	32	M26x1.5	2	M5	29	9	17	6	8	27
GN 442-32-M26x1.5-2-BL	32	M26x1.5	2	M5	29	9	17	6	8	27
GN 442-40-G1-1-SW	40	G1	2	M5	32.5	11	18	7	8	48
GN 442-40-G1-1-BL	40	G1	2	M5	32.5	11	18	7	8	48
GN 442-40-G1-2-SW	40	G1	2	M5	32.5	11	18	7	8	48
GN 442-40-G1-2-BL	40	G1	2	M5	32.5	11	18	7	8	48

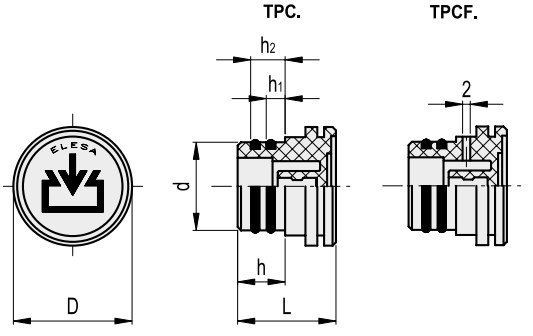
TPC.

ELESA Original design

Oil fill plugs for push-fit

RoHS PP +100°C -20°C

- **Material**
  High-resilience polypropylene based (PP) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
  - TPC.: without side hole.
  - TPCF.: Ø 2 mm side breather hole.
- **Colour**
  Black, matte finish.
- **Packing rings**
  Two NBR synthetic rubber O-rings.
- **Maximum continuous working temperature**
  100°C.
- **Graphic symbol "fill"**
  According to DIN regulations.



Standard Elements		Main dimensions						⚖
Code	Description	d	h	D	L	h1	h2	g
59861	TPC.20	20	14	30	29	6.5	10.5	8
59881	TPC.26	26	14	35	29.5	6.5	10.5	15

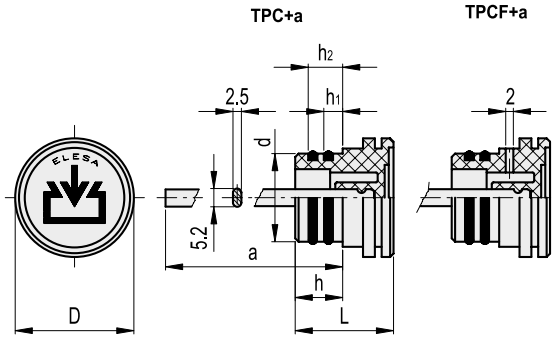
Standard Elements		Main dimensions							⚖
Code	Description	d	h	D	L	h1	h2	d1	g
59901	TPCF.20	20	14	30	29	6.5	10.5	2	8
59921	TPCF.26	26	14	35	29.5	6.5	10.5	2	15

TPC+a

ELESA Original design

Oil fill plugs with flat dipstick for push-fit

- **Material**
  High-resilience polypropylene based (PP) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
  - TPC+a: without side hole.
  - TPCF+a: Ø 2 mm side breather hole.
- **Colour**
  Black, matte finish.
- **Packing rings**
  Two NBR synthetic rubber O-rings.
- **Flat dipstick**
  Phosphatised steel. On request and for sufficient quantities dipstick can be supplied in different lengths and/or complete with MAX-MIN level lines.
- **Maximum continuous working temperature**
  100°C.
- **Graphic symbol "fill"**
  According to DIN regulations.



Standard Elements		Main dimensions							⚖
Code	Description	d	h	D	L	h1	h2	a	g
59865	TPC.20+a	20	14	30	29	6.5	10.5	188	27
59885	TPC.26+a	26	14	35	29.5	6.5	10.5	188	35

Standard Elements		Main dimensions								⚖
Code	Description	d	h	D	L	h1	h2	d1	a	g
59905	TPCF.20+a	20	14	30	29	6.5	10.5	2	188	27
59925	TPCF.26+a	26	14	35	29.5	6.5	10.5	2	188	35

T.440

ELESA Original design

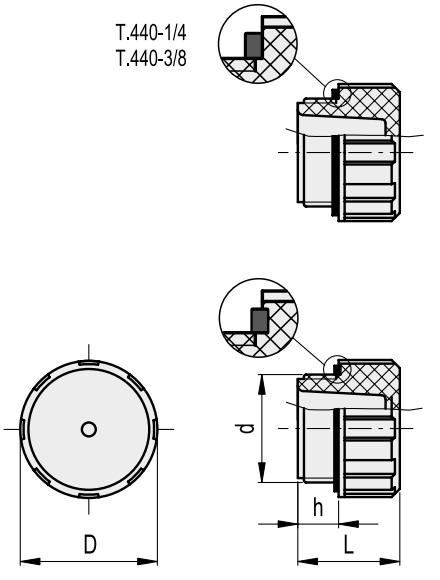
Plugs

RoHS PA +100°C -30°C

- **Material**
  Polyamide based (PA) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
- **Colour**
  Black, matte finish.
- **Flat packing ring**
  NBR synthetic rubber.
- **Maximum continuous working temperature**
  100°C.

Special executions on request (For sufficient quantities)
Coloured words, marks and graphic symbols can be tampoprinted on the cap.

T.440-1/4
T.440-3/8



Standard Elements		Main dimensions				⚖
Code	Description	d	h	D	L	g
157111	T.440-1/4	G 1/4	9	20.5	19	10
157121	T.440-3/8	G 3/8	9	25	21	12
157131	T.440-1/2	G 1/2	11	28.5	25	14
157141	T.440-3/4	G 3/4	12	34.5	27	22
157151	T.440-1	G 1	13	42.5	28.5	28
157161	T.440-1¼	G 1¼	13	52	32	52
157171	T.440-1½	G 1½	13	57.5	34	63

T.440+a

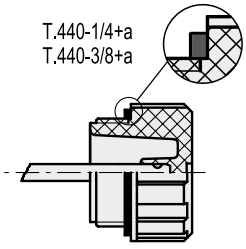
ELESA Original design

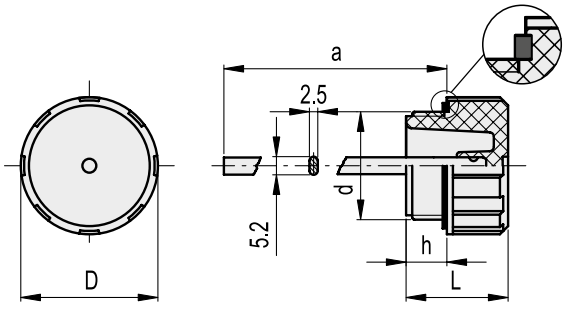
Plugs with flat dipstick

RoHS PA +100°C -30°C

- **Material**
  Polyamide based (PA) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
- **Colour**
  Black, matte finish.
- **Flat packing ring**
  NBR synthetic rubber.
- **Flat dipstick**
  Phosphatised steel. On request and for sufficient quantities dipstick can be supplied in different lengths and/or complete with MAX-MIN level lines.
- **Maximum continuous working temperature**
  100°C.

Special executions on request (For sufficient quantities)
Coloured words, marks and graphic symbols can be tampoprinted on the cap.





Standard Elements		Main dimensions					⚖
Code	Description	d	h	D	L	a	g
157211	T.440-1/4+a	G 1/4	9	20.5	19	192	30
157221	T.440-3/8+a	G 3/8	9	25	21	192	32
157231	T.440-1/2+a	G 1/2	11	28.5	25	189	42
157241	T.440-3/4+a	G 3/4	12	34.5	27	188	50
157251	T.440-1+a	G 1	13	42.5	28.5	188	56
157261	T.440-1¼+a	G 1¼	13	52	32	185	72
157271	T.440-1½+a	G 1½	13	57.5	34	185	83

TVD.

ELESA Original design

Breather caps with vacuum breaker valve

RoHS PP +50° -20°

- **Cover**
  Polypropylene based (PP) technopolymer with tampoprinted graphic symbol "valve" in black colour. Resistant to oils, greases and other chemical agents. Avoid contact with solvents, alcohol or detergents containing alcohol to preserve tampoprinted graphic symbol.
- **Colour**
  - Red (with EPDM ethylene-propylene-dien synthetic rubber packing ring).
  - Green (with FKM fluorated synthetic rubber packing ring).
  On request and for sufficient quantities the cover can be also supplied in black colour, with graphic symbol valve tampoprinted in other colour.
- **Threaded connector**
  Polypropylene based (PP) technopolymer, black colour. Resistant to solvents, oils, greases and other chemical agents.
- **Flat packing ring**
  EPDM (red cap) or FKM (green cap).
- **Membrane gasket**
  EPDM (red cap) or FKM (green cap).
- **Maximum continuous working temperature**
  50°C.

Features and applications

TVD. breather caps with vacuum breaker valve are suitable for reservoirs and tanks for liquid transport. The membrane retaining system allows a quick emptying out of the reservoir by letting in big quantities of air through the cap. Thus avoiding the vacuum inside the reservoir, slowing down the liquid exit.
The pre-set pressure of the membrane gasket stops any liquid loss when the reservoir is shaken (for example during transportation). The liquid pressure on the gasket guarantees a perfect seal of the cap, for example in case of overturning of the reservoir.

Note

Please contact ELESA Technical Department for further chemical resistance details to particular liquids not reported in the table.

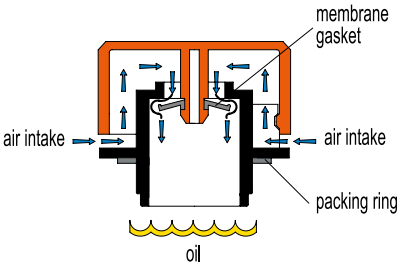
RESISTANCE TO CHEMICAL AGENTS AT AMBIENT TEMPERATURE (23°C)

CHEMICAL AGENT	EPDM	FKM	PP
ALDEHYDE (FORMALDEHYDE)	●	▲	●
ALCOHOL	●	▲	●
ALIPHATIC HYDROCARBONS (PETROL, GAS OIL, ETHANE, PROPANE, BUTANE)	▲	●	■
ANIMAL AND VEGETAL OILS AND GRASES	▲	●	●
AROMATIC HYDROCARBONS (TOLUOL, XYLOL)	▲	●	■
BENZOL	▲	●	▲
CONC. ACETIC ACID 40%	●	▲	●
CONC. AMMONIA	●	▲	●
CONC. HYDROCHLORIC ACID 10%	●	●	●
CONC. NITRIC ACID 10%	▲	●	■
CONC. SULPHURIC ACID 20%	▲	●	●
ESTERS	●	▲	●
GLYCOL	●	●	●
KETONES (ACETONE, METHYL ETHYL KETONE)	●	▲	●
MINERAL OILS AND GREASES	▲	●	■
POOR ACIDS	●	●	●
POOR BASES	●	●	●
STRONG ACIDS	●	▲	●
STRONG BASES	●	▲	●

Resistance: ● Good ■ Fair ▲ Poor

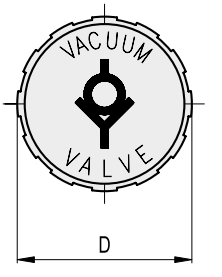
The characteristics described should be treated as guidelines only.
Tests carried out in standard laboratory conditions.

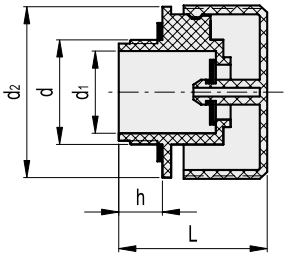
Operating layout



The membrane gasket warps and lets air inside the reservoir due to the effect of the vacuum which is created by the liquid discharge.

DEPRESSION	FLOW RATE	
	FKM	EPDM
50 mb	360 l/min	370 l/min
40 mb	320 l/min	330 l/min
30 mb	260 l/min	280 l/min
20 mb	210 l/min	230 l/min
10 mb	140 l/min	160 l/min
5 mb	110 l/min	130 l/min





Standard Elements		Main dimensions						⚖
Code	Description	d	D	L	h	d1	d2	g
61011	TVD.70-1¼-FKM	G 1¼	70	59	17	33	68.5	80
61021	TVD.70-1¼-EPDM	G 1¼	70	59	17	33	68.5	80

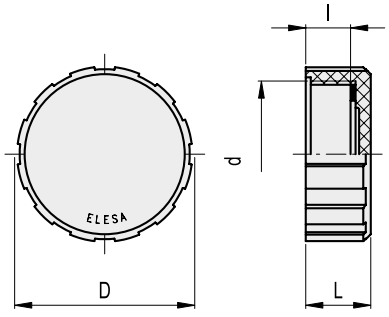
T.470

ELESA Original design

Plugs

- **Material**
  Polyamide based (PA) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
- **Colour**
  Black, matte finish.
- **Flat packing ring**
  NBR synthetic rubber.
- **Maximum continuous working temperature**
  100°C.

Special executions on request (For sufficient quantities)
Coloured words, marks and graphic symbols can be tampoprinted on the cap.



Standard Elements		Main dimensions				⚖
Code	Description	d	l	D	L	g
58231	T.470-60x2	M60x2	18	70	26	55
58251	T.470-1	G 1	11	42	16	17
58281	T.470-2	G 2	18	70	26	58

GN 880

Oil drain valves

RoHS

- **Valve body**
  - Version **ST**: zinc-plated Steel, blue passivated.
  - Version **MS**: brass.
- **Valve plate**
  Brass, with O-ring rubber FPM (Viton®).
- **Sealing DIN 7603 A**
  Copper.
- **Protective cap**
  Plastic, Polyamide based (PA) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
- **Chain**
  Zinc-plated Steel, blue passivated, eye brass.
- **Standard version available**
  Type **K**: with plastic protective cap and chain.

Accessories on request

- other materials.
- with Stainless Steel cable (instead of chain).

Features and applications

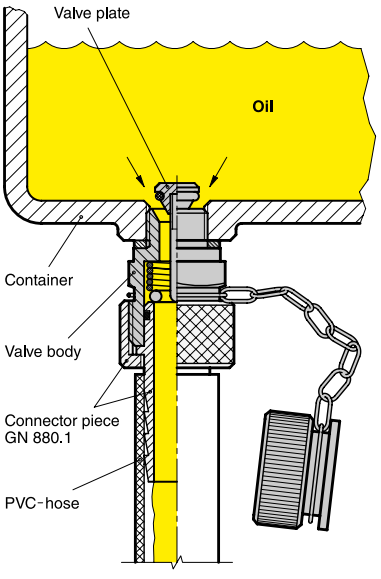
Oil drain valves GN 880 may be used for draining non-pressurised oil, as well conditionally as for vacuum drainage.
The flow volume (l/min.) depends on the viscosity of the medium, the filling quantity and the temperature. Guidance values available on request.
Other features are:

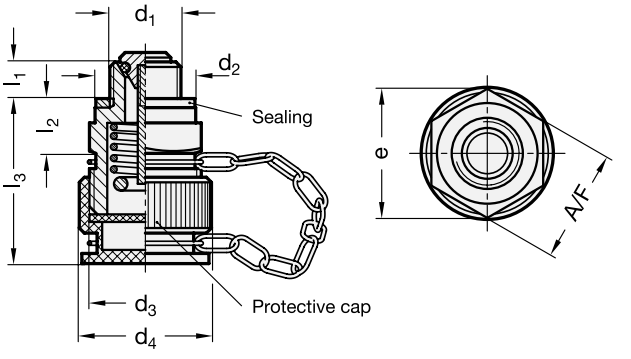
- easy and safe handling
- optimum flow rate
- high pressure resistance (up to 100 bar)
- high temperature resistance (-30°C to +120°C short period up to 180°C)
- 100% seal-tight tested

Operation description

After removing the protective cap secured against loss with a chain, turn in the matching connector pieces GN 880.1.
When the connector is screwed in, the valve plate will open and the oil will empty through the hose into a pan.
Take off the connector after the oil has drained. The valve plate will be lowered and closes off the drainage outlet.
The container with the oil drain vale is ready for filling again.
Other benefits of the oil drain valves GN 880:

- No risk of burns caused by hot oil
- No dirt caused by uncontrolled oil drainage
- Quick and easy





Standard Elements	Main dimensions									⚖
Description	d1	d2	d3*	d4	e ≈	l1	l2	l3	A/F	g
GN 880-M14x1.5-ST-K	M14x1.5	20	M22x1.5	26	25.4	7.5	10.5	31	22	54
GN 880-M16x1.5-ST-K	M16x1.5	22	M22x1.5	26	25.4	7.5	10.5	31	22	58
GN 880-M18x1.5-ST-K	M18x1.5	24	M22x1.5	26	25.4	8.5	10.5	31	22	62
GN 880-M20x1.5-ST-K	M20x1.5	26	M22x1.5	26	31.2	8.5	10.5	31	27	81
GN 880-M22x1.5-ST-K	M22x1.5	27	M26x1.5	30	31.2	8.5	12	32	27	94
GN 880-G1/4-ST-K	G1/4	20	M22x1.5	26	25.4	7.5	10.5	31	22	55
GN 880-G3/8-ST-K	G3/8	23	M22x1.5	26	25.4	7.5	10.5	31	22	61
GN 880-G1/2-ST-K	G1/2	26	M26x1.5	30	31.2	8.5	12	32	27	91
GN 880-M24x1.5-MS-K	M24x1.5	29	M26x1.5	30	34.7	9	12	32	30	116
GN 880-M26x1.5-MS-K	M26x1.5	32	M26x1.5	30	37	9	12	32	32	132
GN 880-M30x1.5-MS-K	M30x1.5	36	M26x1.5	30	41.6	9	12	32	36	166
GN 880-G3/4-MS-K	G3/4	32	M26x1.5	30	37	9	12	32	32	133
GN 880-G1-MS-K	G1	39	M26x1.5	30	47.3	9	12	32	41	205

* Connection thread for GN 880.1.

GN 880.1

Connector pieces

RoHS

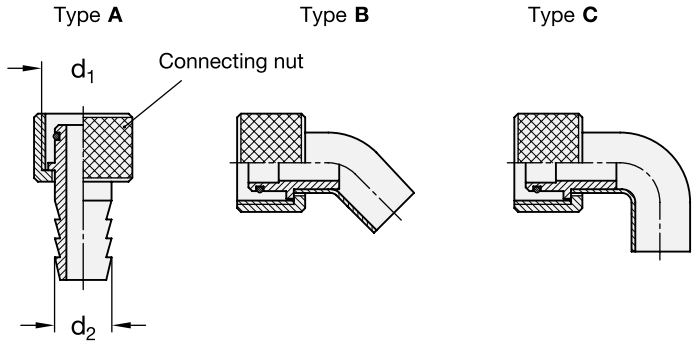
- **Connecting nut**
  Brass, with hose liner.
- **L bend**
  Copper 45° / 90°.
- **O-ring**
  NBR (Perbunan) synthetic rubber.
- **Hose clip**
  Zinc-plated steel.
- **Plug**
  Plastic, LD-PE.
- **Standards versions available**
  - Type **A**: Connector straight.
  - Type **B**: Connector 45°.
  - Type **C**: Connector 90°.

Accessories on request

- other hose length.
- Drain hose with inside webbing (Nylon).

Features and applications

Connector pieces GN 880.1 are required when using oil drain valves GN 880. Screwing on the connector piece will activate the valve plate of the oil drain valve, allowing the oil to flow through the hose into a pan held ready. The plug prevents remaining oil from dripping out after discharging.
The plugs and the hose clip (only type B and C) are included parts of the order.



Standard Elements	Main dimensions			⚖
Description	Size	d1*	d2	g
GN 880.1-22-A	22	M22x1.5	15	58
GN 880.1-22-B	22	M22x1.5	15	58
GN 880.1-22-C	22	M22x1.5	15	61
GN 880.1-26-A	26	M26x1.5	20	88
GN 880.1-26-B	26	M26x1.5	20	86
GN 880.1-26-C	26	M26x1.5	20	89

* Connection thread GN 880

GN 880.1

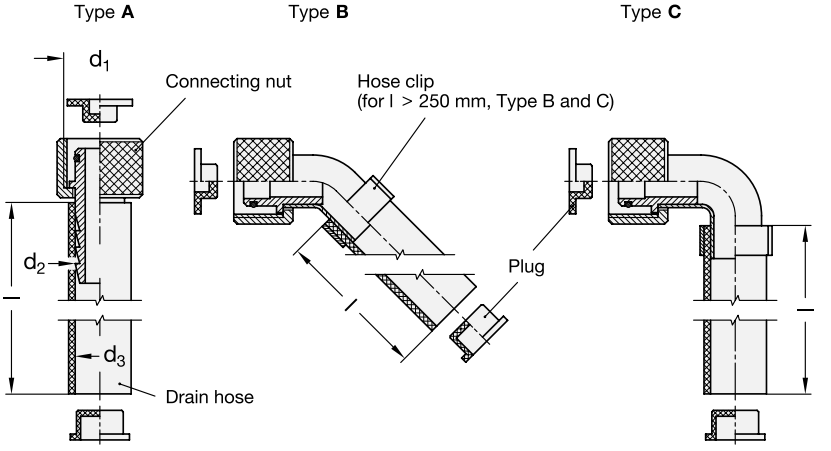
Connector pieces with drain hose

RoHS

- **Connecting nut**
  Brass, with hose liner.
- **L bend**
  Copper 45° / 90°.
- **O-ring**
  NBR (Perbunan) synthetic rubber.
- **Drain hose**
  Version **T**: PVC, transparent.
- **Hose clip**
  Zinc-plated steel.
- **Plug**
  Plastic, LD-PE.
- **Standard versions available**
  - Type **A**: Connector straight.
  - Type **B**: Connector 45°.
  - Type **C**: Connector 90°.

Accessories on request
- other hose length.
- Drain hose with inside webbing (Nylon).

Features and applications
Connector pieces GN 880.1 are required when using oil drain valves GN 880.
Screwing on the connector piece will activate the valve plate of the oil drain valve, allowing the oil to flow through the hose into a pan held ready.
The plug prevents remaining oil from dripping out after discharging.



Standard Elements	Main dimensions					⚖
Description	Size	d1*	l	d2	d3	g
GN 880.1-22-A-250-T	22	M22x1.5	250	15	14	97
GN 880.1-22-B-250-T	22	M22x1.5	250	15	14	97
GN 880.1-22-C-250-T	22	M22x1.5	250	15	14	97
GN 880.1-22-A-500-T	22	M22x1.5	500	15	14	140
GN 880.1-22-B-500-T	22	M22x1.5	500	15	14	140
GN 880.1-22-C-500-T	22	M22x1.5	500	15	14	140
GN 880.1-22-A-1000-T	22	M22x1.5	1000	15	14	220
GN 880.1-22-B-1000-T	22	M22x1.5	1000	15	14	220
GN 880.1-22-C-1000-T	22	M22x1.5	1000	15	14	220
GN 880.1-26-A-250-T	26	M26x1.5	250	20	19	153
GN 880.1-26-B-250-T	26	M26x1.5	250	20	19	153
GN 880.1-26-B-250-T	26	M26x1.5	250	20	19	153
GN 880.1-26-A-500-T	26	M26x1.5	500	20	19	230
GN 880.1-26-B-500-T	26	M26x1.5	500	20	19	230
GN 880.1-26-C-500-T	26	M26x1.5	500	20	19	230
GN 880.1-26-A-1000-T	26	M26x1.5	1000	20	19	390
GN 880.1-26-B-1000-T	26	M26x1.5	1000	20	19	390
GN 880.1-26-C-1000-T	26	M26x1.5	1000	20	19	390

* Connection thread for GN 880.

GN 881

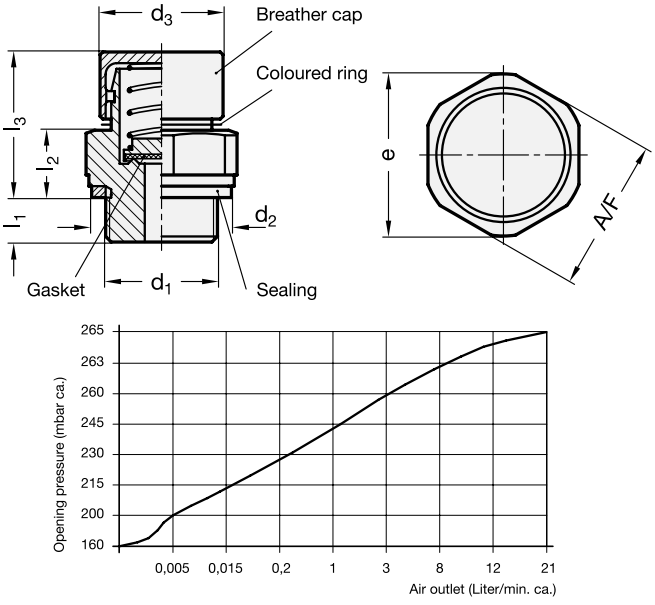
Breather valves

RoHS

- **Material**
  Brass **MS**.
- **Breather cap**
  Type **M:** AISI 304 Stainless Steel.
- **Gasket**
  Brass, with silicone-rubber coating (VMQ).
- **Spring**
  AISI 301 stainless steel.
- **Sealing DIN 7603 A**
  Soft iron 1.0338.
- **Temperature resistance**
  From -30°C to +100°C.

Accessories on request
- other materials.
- with other opening pressure (20 mbar, yellow ring).
- with dipstick.

Features and applications
Once the opening pressure given in the table is exceeded, breather valves GN 881 with gasket will vent into a container and so protect against excessive inside container pressure. A green colour ring marks the opening pressure of 200 mbar.
In its normal state, the gasket closes the container and so prevents dirt or dust getting inside the container.
The above diagram shows the air outlet as a factor of the opening pressure.
The valves are checked for leak tightness and opening pressure.



Standard Elements	Main dimensions								Opening pressure in mbar ±20%	⚖
Description	d1	d2	d3	e ≈	l1	l2	l3	A/F		g
GN 881-M12x1.5-200-MS-M	M12x1.5	18	20	23.5	8.5	11.5	24.5	22	200	39
GN 881-M14x1.5-200-MS-M	M14x1.5	20	20	20	8.5	11.5	24.5	22	200	44
GN 881-M16x1.5-200-MS-M	M16x1.5	22	20	20	8.5	11.5	24.5	22	200	49
GN 881-M18x1.5-200-MS-M	M18x1.5	24	20	23.5	8.5	11.5	24.5	22	200	52
GN 881-M20x1.5-200-MS-M	M20x1.5	26	20	29	8.5	11.5	24.5	27	200	74
GN 881-M22x1.5-200-MS-M	M22x1.5	27	20	29	8.5	11.5	24.5	27	200	79
GN 881-M24x1.5-200-MS-M	M24x1.5	29	20	32.5	8	12	25	30	200	96
GN 881-M26x1.5-200-MS-M	M26x1.5	32	20	34	8	12	25	32	200	112
GN 881-M30x1.5-200-MS-M	M30x1.5	36	20	39	8	12	25	36	200	148
GN 881-G1/4-200-MS-M	G1/4	20	20	23.5	8.5	11.5	24.5	22	200	42
GN 881-G3/8-200-MS-M	G3/8	23	20	23.5	8.5	11.5	24.5	22	200	51
GN 881-G1/2-200-MS-M	G1/2	26	20	29	8.5	11.5	24.5	27	200	76
GN 881-G3/4-200-MS-M	G3/4	32	20	34	8	12	25	32	200	113
GN 881-G1-200-MS-M	G1	39	20	44	8	12	25	41	200	186

GN 882

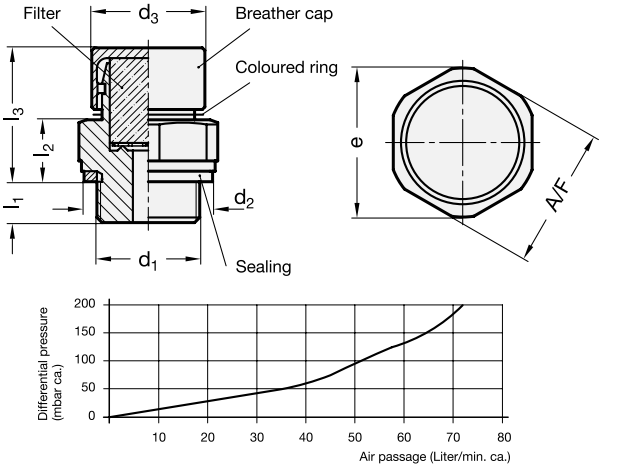
Breather filters

RoHS

- **Material**
  Brass.
- **Breather cap**
  Type **M**: AISI 304 Stainless steel.
- **Air filter**
  - Wire mesh, AISI 304 stainless steel.
  - Filter category G2-G3.
  - Mean separation rate (Am approx. 65-85 %, based in a particle size > 10 µm).
- **Spring**
  Stainless steel.
- **Sealing DIN 7603 A**
  Soft iron 1.0338.
- **Temperature resistance**
  From -30°C to +100°C.

Accessories on request
- other materials.
- with dipstick.

Features and applications
Breather filters GN 882 are used when the air exchange is to be allowed between the inside of the container and the ambient air. A blue colour ring marks the filter function.
The filter prevents air-borne particles (e.g. dust) from being carried from the outside to the inside of the container. It also ensures that e.g. oil particles do not escape to the outside.
The above diagram shows the air passage as a factor of the differential pressure.



Standard Elements	Main dimensions								⚖
Description	**d1**	**d2**	**d3**	**e ≈**	**l1**	**l2**	**l3**	**A/F**	**g**
GN 882-M12x1.5-MS-M	M12x1.5	18	20	23.5	8.5	11.5	24.5	22	40
GN 882-M14x1.5-MS-M	M14x1.5	20	20	23.5	8.5	11.5	24.5	22	44
GN 882-M16x1.5-MS-M	M16x1.5	22	20	23.5	8.5	11.5	24.5	22	49
GN 882-M18x1.5-MS-M	M18x1.5	24	20	23.5	8.5	11.5	24.5	22	53
GN 882-M20x1.5-MS-M	M20x1.5	26	20	29	8.5	11.5	24.5	27	75
GN 882-M22x1.5-MS-M	M22x1.5	27	20	29	8.5	11.5	24.5	27	79
GN 882-M24x1.5-MS-M	M24x1.5	29	20	32.5	8	12	25	30	97
GN 882-M26x1.5-MS-M	M26x1.5	32	20	34	8	12	25	32	113
GN 882-M30x1.5-MS-M	M30x1.5	36	20	39	8	12	25	36	148
GN 882-G1/4-MS-M	G1/4	20	20	23.5	7.5	10.5	24.5	22	42
GN 882-G3/8-MS-M	G3/8	23	20	23.5	8.5	11.5	24.5	22	49
GN 882-G1/2-MS-M	G1/2	26	20	29	8	12	25	27	75
GN 882-G3/4-MS-M	G3/4	32	20	34	8	12	25	32	113
GN 882-G1-MS-M	G1	39	20	44	8	12	25	41	186

GN 883

Breather valves

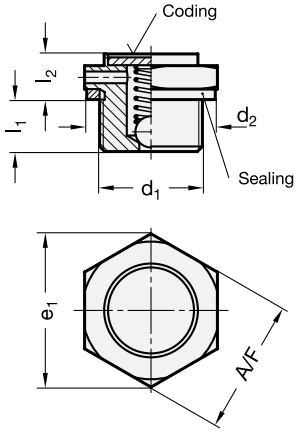
RoHS

- **Material**
  Brass.
- **Breather cap**
  Plastic, Polyamide based (PA) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
- **Bore**
  AISI 5210 stainless steel.
- **Spring**
  AISI 301 stainless steel.
- **Sealing DIN 7603 A**
  Soft iron 1.0338 (for d1=M10x1:PA6)
- **Temperature resistance**
  From -30°C to +100°C.
- **Standard versions available**
  - Type **A**: low desgin.
  - Type **B**: high design, with plastic cap.

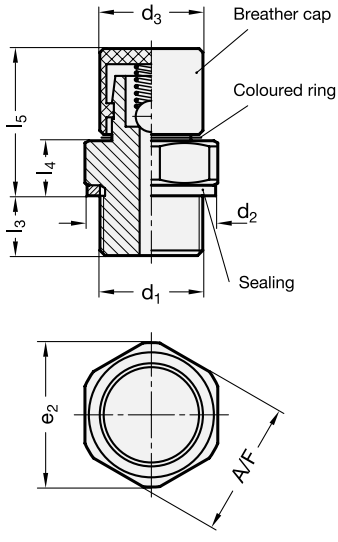
Accessories on request
- other materials.
- with dipstick.

Features and applications
Once the opening pressure given in the table is exceeded, breather valves GN 883 will vent into a container and so protect against excessive inside container pressure. They also feature highly compact dimensions.
A coding (Type A) or a colour ring (Type B) in yellow (20 - 80 mbar) or green (160 - 240 mbar) indicates the different opening pressure ratings.
The simple function principle (pressure spring / ball) ensures long and trouble-free use of the valve. The installation position is vertical to the top.

Type **A**



Type **B**



Standard Elements	Main dimensions											Opening pressure in mbar		ca. air passage l/min.	⚖
Description	d1	d2	d3	e1	e2	l1	l2	l3	l4	l5	A/F	min.	max.		g
GN 883-M10x1-20-A-MS	M10x1	17	-	16	-	6	6	-	-	-	14	20	80	1.2	8
GN 883-M10x1-160-A-MS	M10x1	17	-	16	-	6	6	-	-	-	14	160	240	1.2	8
GN 883-M12x1.5-20-A-MS	M12x1.5	18	-	19.5	-	6.5	6	-	-	-	17	20	80	1.2	14
GN 883-M12x1.5-160-A-MS	M12x1.5	18	-	19.5	-	6.5	6	-	-	-	17	160	240	1.2	14
GN 883-M14x1.5-20-A-MS	M14x1.5	20	-	19.5	-	6.5	6	-	-	-	17	20	80	1.2	16
GN 883-M14x1.5-160-A-MS	M14x1.5	20	-	19.5	-	6.5	6	-	-	-	17	160	240	1.2	16
GN 883-M16x1.5-20-A-MS	M16x1.5	22	-	25	-	9	11	-	-	-	22	20	80	1.2	35
GN 883-M16x1.5-160-A-MS	M16x1.5	22	-	25	-	9	11	-	-	-	22	160	240	1.2	36
GN 883-M10x1-20-B-MS	M10x1	-	13	-	18.5	-	-	8	7	18.5	17	20	80	1.8	19
GN 883-M10x1-160-B-MS	M10x1	-	13	-	18.5	-	-	8	7	18.5	17	160	240	1.8	19
GN 883-M12x1.5-20-B-MS	M12x1.5	-	13	-	18.5	-	-	7.5	7	19	17	20	80	1.8	22
GN 883-M12x1.5-160-B-MS	M12x1.5	18	13	-	18.5	-	-	7.5	7	19	17	160	240	1.8	22
GN 883-M14x1.5-20-B-MS	M14x1.5	20	13	-	18.5	-	-	7.5	7.5	19	17	20	80	1.8	25
GN 883-M14x1.5-160-B-MS	M14x1.5	20	13	-	18.5	-	-	7.5	7.5	19	17	160	240	1.8	25
GN 883-M16x1.5-20-B-MS	M16x1.5	22	13	-	24	-	-	7.5	7.5	19	22	20	80	1.8	36
GN 883-M16x1.5-160-B-MS	M16x1.5	22	13	-	24	-	-	7.5	7.5	19	22	160	240	1.8	36
GN 883-G1/4-20-A-MS	G1/4	20	-	19.5	-	6.5	6	-	-	-	17	20	80	1.2	15
GN 883-G1/4-160-A-MS	G1/4	20	-	19.5	-	6.5	6	-	-	-	17	160	240	1.2	15
GN 883-G3/8-20-A-MS	G3/8	23	-	25	-	9	11	-	-	-	22	20	80	1.2	37
GN 883-G3/8-160-A-MS	G3/8	23	-	25	-	9	11	-	-	-	22	20	240	1.2	37
GN 883-G1/2-20-A-MS	G1/2	26	-	31	-	8.5	11	-	-	-	27	20	80	1.2	46
GN 883-G1/2-160-A-MS	G3/8	23	-	25	-	9	11	-	-	-	22	160	240	1.2	54
GN 883-G3/4-20-A-MS	G3/4	32	-	37	-	8.5	11	-	-	-	32	20	80	1.2	72
GN 883-G3/4-160-A-MS	G3/4	32	-	37	-	8.5	11	-	-	-	32	160	240	1.2	83
GN 883-G1/4-20-B-MS	G1/4	20	13	-	18.5	-	-	7.5	7.5	19	17	20	80	1.8	24
GN 883-G1/4-160-B-MS	G1/4	20	13	-	18.5	-	-	7.5	7.5	19	17	160	240	1.8	24
GN 883-G3/8-20-B-MS	G3/8	23	13	-	24	-	-	7.5	7.5	19	22	20	80	1.8	38
GN 883-G3/8-160-B-MS	G3/8	23	13	-	24	-	-	7.5	7.5	19	22	160	240	1.8	38
GN 883-G1/2-20-B-MS	G1/2	26	13	-	29	-	-	8	8	19.5	27	20	80	1.8	56
GN 883-G1/2-160-B-MS	G1/2	26	13	-	29	-	-	8	8	19.5	27	160	240	1.8	56
GN 883-G3/4-20-B-MS	G3/4	32	13	-	35	-	-	8	8	19.5	32	20	80	1.8	84
GN 883-G3/4-160-B-MS	G3/4	32	13	-	35	-	-	8	8	19.5	32	160	240	1.8	84

SFC.

ELESA Original design

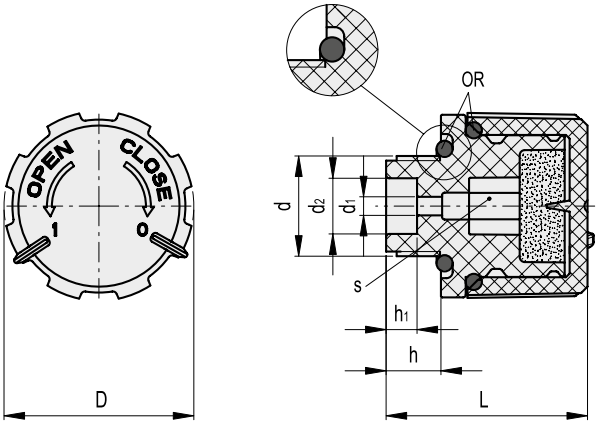
Breather cap with sealing closure

RoHS PA POM +80° 0°

- **Cover**
  Polyamide based (PA) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
- **Threaded connector**
  Acetal based technopolymer (POM).
- **Colour**
  Black, semi-matte finish.
- **Packing rings**
  NBR synthetic rubber O-Ring.
- **Air filter**
  Polyurethane foam mesh "tech-foam" (polyester base), air filtration 10 µ.
- **Maximum continuous working temperature**
  80°C.

Special executions on request *(For sufficient quantities)*
- Air filter in polyurethane foam mesh "tech-foam" (polyester based) with air filtration 40 µ.
- Cover in RAL 2004 orange.

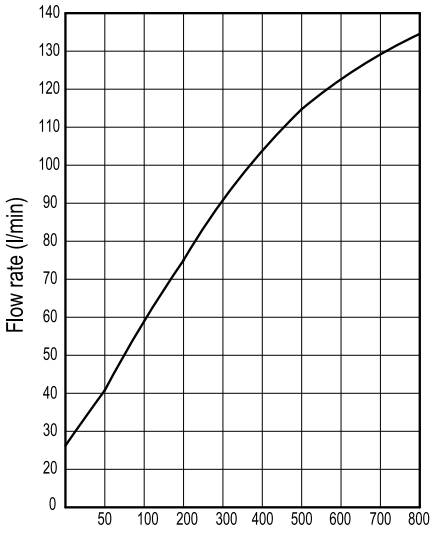
Features and applications
The cover of the SFC. breather cap (ELESA Patent) offers two different closure modes:
- Sealing closure: the cap is completely clamped and closed. The packing ring between the cover and the threaded connector flange guarantees a perfect sealing of gas or liquid contained in the reservoir.
- Breather closure: air is let in and out of the reservoir in normal conditions of use.



Standard Elements		Main dimensions								⚖
Code	Description	d	h	D	L	d1	d2	h1	s	g
52801	SFC.30-3/8+F	G 3/8	9	30	33	3	9	5	8	18

Assembly instructions

1) Screw the threaded connector by means of a hexagon key, maximum tightening torque 8 Nm (Fig. 1).
2) Insert the "tech-foam" filter in its proper upper housing.
3) Fit the cover on the threaded connector by properly matching the two different teeth (different for shape) of the cover and the relevant knurling on the upper part of the threaded connector (Fig. 2). On this knurling there are two stop positions, where the teeth of the cover are fitted: one is for the breather closure and the other one is for the sealing closure.
4) Breather closure. After fitting the cover (see point 3), turn it following the CLOSE arrow (clockwise) until the first click. In this position the cover is locked by means of the teeth fitted in the relative stop housing of the knurling: this is a guarantee against accidentaly unscrewing. In this position the index on the cover marked with 1 is in line with the index on the flange of the threaded connector (Fig. 3).
5) Sealing closure. To reach sealing closure from breather closure (see point 4), turn the cover following the CLOSE arrow (clockwise) until the click. In this position the cover is locked by means of the teeth fitted in the relative stop housing of the knurling: this is a guarantee against accidentaly unscrewing. In this position the index on the cover marked with 0 is in line with the index on the flange of the threaded connector (Fig. 4).
6) To reach breather closure (index on the cover marked with 1 in line with the index on the threaded connector) to sealing closure (index on the cover marked with 0 in line with the index on the threaded connector) just turn the cover following the OPEN arrow (anticlockwise) until the click (Fig. 3).
7) By turning the cover following the OPEN arrow (anticlockwise), from breather closure it is possible to remove the cover from the threaded connector after the click, thus allowing the operator to clean the components or to substitute the "tech-foam" filter (Fig. 5).



(difference between the pressure inside and outside the reservoir)

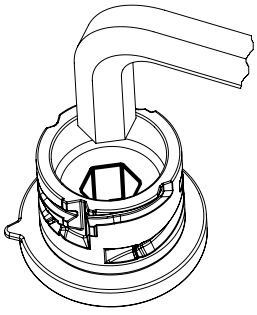


Fig.1

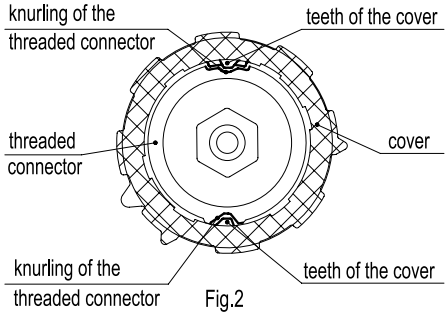


Fig.2

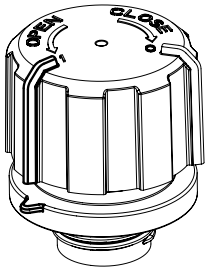


Fig.3

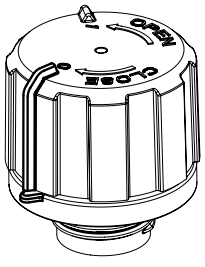


Fig.4

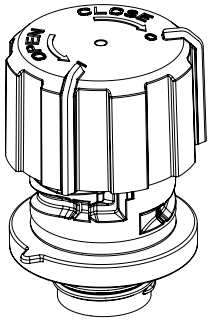


Fig.5

SFN.

ELESA Original design

Breather caps

RoHS PA +100°C -30°C

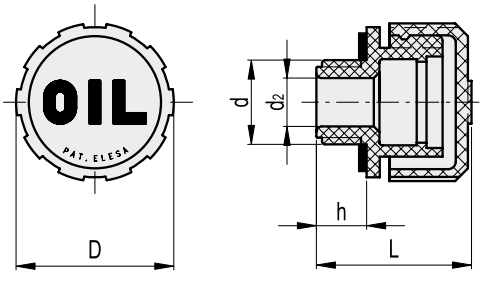
- **Cover and threaded connector**
  Polyamide based (PA) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
- **Colour**
  - Cover: RAL 2004 orange, semi-matte finish, marked "OIL".
  - Threaded connector: black, semi-matte finish.
- **Flat packing ring**
  NBR synthetic rubber.
- **Standard executions available**
  - **SFN.**: without air filter.
  - **SFN+F**: with "tech-foam" air filter in polyurethane foam mesh (polyester base), air filtration 40 µ.
  - **SFN.70-BA+F**: with "tech-foam" air filter in polyurethane foam mesh (polyester base), air filtration 40 µ and zinc-plated steel sheet bayonet and chrome-plated steel safety chain.
- **Maximum continuous working temperature**
  100°C.

Special executions on request (For sufficient quantities)
- Cover, RAL 2004 orange, without "OIL" mark.
- Black cover with or without "OIL" mark.

Features and applications
SFN. breather caps, owing to their high air flow rate, are particularly suitable for use on hydraulic power packs or tanks subject to rapid changes in liquid volume.

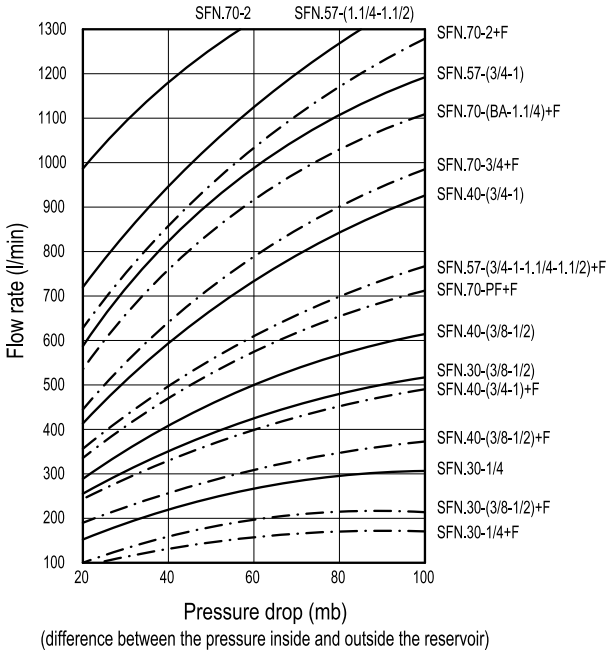
Technical data
Air flow rate for each model can be determined from the graph calculating the difference between the pressure inside and outside the reservoir.

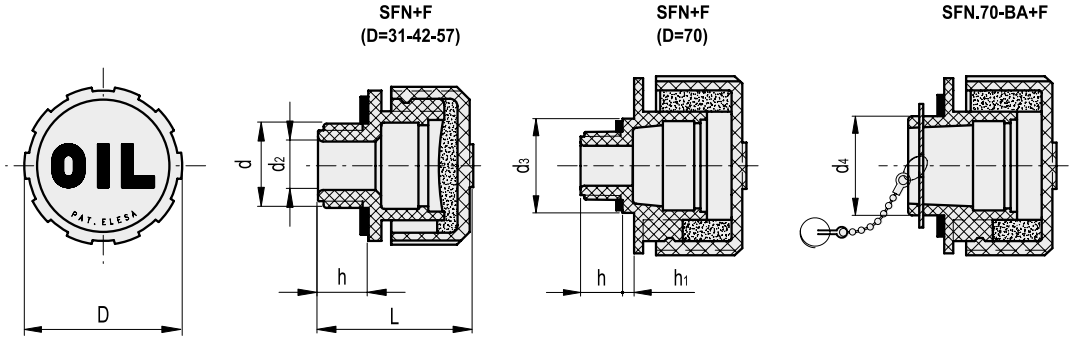
SFN.



Standard Elements		Main dimensions					⚖
Code	Description	d	h	D	L	d2	g
56151#	SFN.30-1/4	G 1/4	9.5	31	29.5	8	10
53901	SFN.30-3/8	G 3/8	9.5	31	29.5	10	10
53911	SFN.30-1/2	G 1/2	9.5	31	29.5	12	11
56181#	SFN.40-3/8	G 3/8	11.5	42	36.5	10	20
56201#	SFN.40-1/2	G 1/2	11.5	42	36.5	12	21
53921#	SFN.40-3/4	G 3/4	11.5	42	36.5	17	20
53931	SFN.40-1	G 1	11.5	42	36.5	18	20
56241#	SFN.57-3/4	G 3/4	14	57	42	18	38
56261	SFN.57-1	G 1	14	57	42	23	40
53932	SFN.57-1¼	G 1¼	16	57	44	32	41
53933	SFN.57-1½	G 1½	16	57	44	32	40
56381	SFN.70-2	G 2	17	70	59	23	79

Types available on request with NPT thread (National Taper pipe Thread - ANSI-ASME B1-20).





Standard Elements		Main dimensions								⚖
Code	Description	d	h	D	L	d2	d3	d4	h1	g
56156#	SFN.30-1/4+F	G 1/4	9.5	31	29.5	8	-	-	-	10
56161	SFN.30-3/8+F	G 3/8	9.5	31	29.5	10	-	-	-	10
56171	SFN.30-1/2+F	G 1/2	9.5	31	29.5	12	-	-	-	11
56191#	SFN.40-3/8+F	G 3/8	11.5	42	36.5	10	-	-	-	19
56211#	SFN.40-1/2+F	G 1/2	11.5	42	36.5	12	-	-	-	20
56221#	SFN.40-3/4+F	G 3/4	11.5	42	36.5	17	-	-	-	20
56231	SFN.40-1+F	G 1	11.5	42	36.5	18	-	-	-	21
56251#	SFN.57-3/4+F	G 3/4	14	57	42	18	-	-	-	37
56271	SFN.57-1+F	G 1	14	57	42	23	-	-	-	38
56281	SFN.57-1¼+F	G 1¼	16	57	44	32	-	-	-	39
56291	SFN.57-1½+F	G 1½	16	57	44	32	-	-	-	40
54701#	SFN.70-3/4+F	G 3/4	15	70	63	16	35	-	6	76
54711	SFN.70-1¼+F	G 1¼	17	70	59	23	-	-	-	77
56391	SFN.70-2+F	G 2	17	70	59	23	-	-	-	82
54731	SFN.70-BA+F	-	14	70	56	23	-	39	-	85

Types available on request with NPT thread (National Taper pipe Thread - ANSI-ASME B1-20).

SFP.

ELESA Original design

Breather caps with splash guard

RoHS PA +100°C -30°C

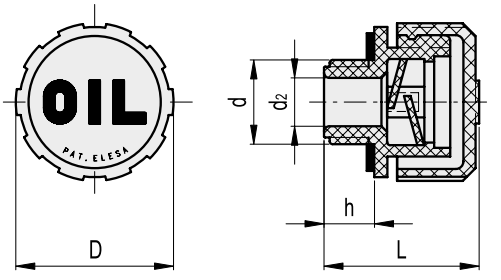
- **Cover and threaded connector**
  Polyamide based (PA) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
- **Colour**
  - Cover: RAL 2004 orange, semi-matte finish, marked "OIL".
  - Threaded connector: black, semi-matte finish.
- **Flat packing ring**
  NBR synthetic rubber.
- **Splash guard**
  Technopolymer.
- **Standard executions available**
  - **SFP.**: without air filter (black splash guard).
  - **SFP+F**: with "tech-foam" air filter in polyurethane foam mesh (polyester base), air filtration 40 µ (grey splash guard) or with "tech-fil" air filter in zinc-plated steel wire (orange splash guard).
  - **SFP.70-BA+F**: with "tech-foam" air filter in polyurethane foam mesh (polyester base), air filtration 40 µ (grey splash guard) and zinc-plated steel sheet bayonet and chrome-plated steel safety chain.
- **Maximum continuous working temperature**
  100°C.

Special executions on request (For sufficient quantities)
- Cover, RAL 2004 orange, without "OIL" mark.
- Black cover with or without "OIL" mark.

Features and applications
SFP. breather caps come complete with splash guard device (ELESA original design) that prevents oil loss and are particularly suitable for use where oil is violently agitated and could be splashed against breather cap.

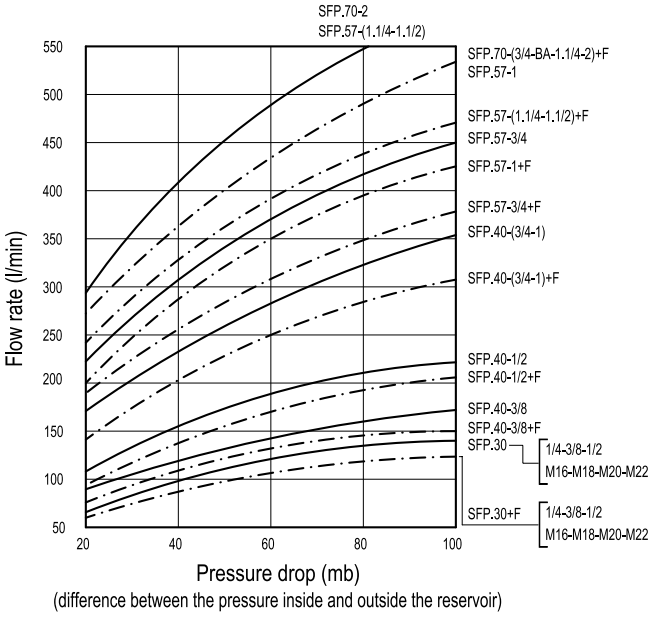
Technical data
Air flow rate for each model can be determined from the graph calculating the difference between the pressure inside and outside the reservoir.

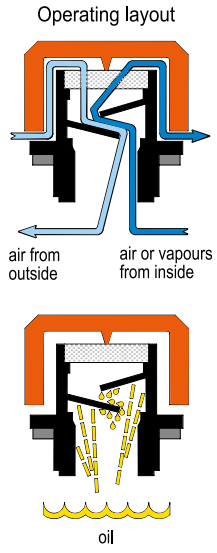
SFP.

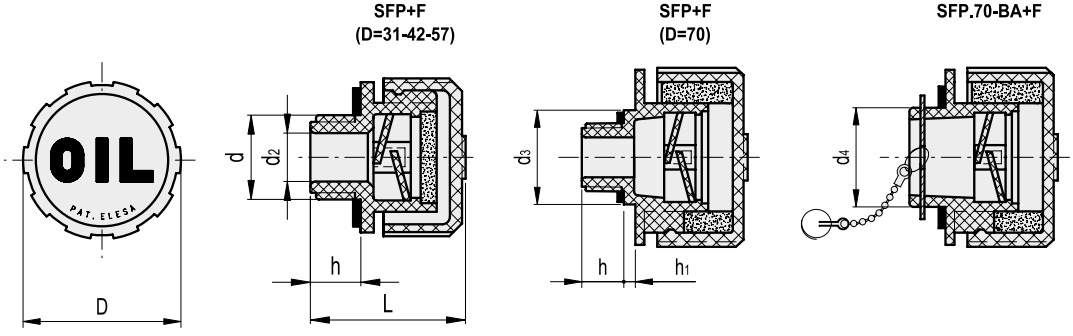


Standard Elements		Main dimensions					⚖
Code	Description	d	h	D	L	d2	g
53941	SFP.30-16x1.5	M16x1.5	9.5	31	29.5	10	10
53961	SFP.30-18x1.5	M18x1.5	9.5	31	29.5	10	10
53981	SFP.30-20x1.5	M20x1.5	9.5	31	29.5	12	11
53991	SFP.30-22x1.5	M22x1.5	9.5	31	29.5	12	11
53935#	SFP.30-1/4	G 1/4	9.5	31	29.5	8	10
54001	SFP.30-3/8	G 3/8	9.5	31	29.5	10	11
54101	SFP.30-1/2	G 1/2	9.5	31	29.5	12	11
56651#	SFP.40-3/8	G 3/8	11.5	42	36.5	10	20
56671#	SFP.40-1/2	G 1/2	11.5	42	36.5	12	22
54201#	SFP.40-3/4	G 3/4	11.5	42	36.5	18	22
54301	SFP.40-1	G 1	11.5	42	36.5	18	22
56701#	SFP.57-3/4	G 3/4	14	57	42	18	40
56731	SFP.57-1	G 1	14	57	42	23	40
54401	SFP.57-1¼	G 1¼	16	57	44	32	41
54501	SFP.57-1½	G 1½	16	57	44	32	45
54876	SFP.70-2	G 2	17	70	59	23	82

Types available on request with NPT thread (National Taper pipe Thread - ANSI-ASME B1-20).







Standard Elements			Main dimensions							⚖
Tech-fil	Tech-foam	Description								
Code			d	h	D	L	d2	d3	d4	h1	g
53951	53952	SFP.30-16x1.5+F*	M16x1.5	9.5	31	29.5	10	-	-	-	12
53971	53972	SFP.30-18x1.5+F*	M18x1.5	9.5	31	29.5	10	-	-	-	13
53986	53987	SFP.30-20x1.5+F*	M20x1.5	9.5	31	29.5	12	-	-	-	13
53996	53997	SFP.30-22x1.5+F*	M22x1.5	9.5	31	29.5	12	-	-	-	14
53937	53938	SFP.30-1/4+F*	G 1/4	9.5	31	29.5	8	-	-	-	11
54021	54022	SFP.30-3/8+F*	G 3/8	9.5	31	29.5	10	-	-	-	13
54121	54122	SFP.30-1/2+F*	G 1/2	9.5	31	29.5	12	-	-	-	15
56661	56662#	SFP.40-3/8+F*	G 3/8	11.5	42	36.5	10	-	-	-	23
56681	56682#	SFP.40-1/2+F*	G 1/2	11.5	42	36.5	12	-	-	-	26
54221	54222#	SFP.40-3/4+F*	G 3/4	11.5	42	36.5	18	-	-	-	28
54321	54322	SFP.40-1+F*	G 1	11.5	42	36.5	18	-	-	-	24
56711	56712#	SFP.57-3/4+F*	G 3/4	14	57	42	18	-	-	-	50
56741	56742	SFP.57-1+F*	G 1	14	57	42	23	-	-	-	50
54421	54422	SFP.57-1¼+F*	G 1¼	16	57	44	32	-	-	-	50
54521	54522	SFP.57-1½+F*	G 1½	16	57	44	32	-	-	-	54
-	54851#	SFP.70-3/4+F*	G 3/4	15	70	63	16	35	-	6	80
-	54861	SFP.70-1¼+F*	G 1¼	17	70	59	23	-	-	-	80
-	54878	SFP.70-2+F*	G 2	17	70	59	23	-	-	-	85
-	54881	SFP.70-BA+F*	-	14	70	56	23	-	39	-	91

Types available on request with NPT thread (National Taper pipe Thread - ANSI-ASME B1-20).

* Complete the description of the standard item needed by adding the type of the air filter tech-fil or tech-foam listed in the code column.

SFP+a

ELESA Original design

Breather caps with splash guard and flat dipstick

RoHS PA +100°C -30°C +120°C -30°C

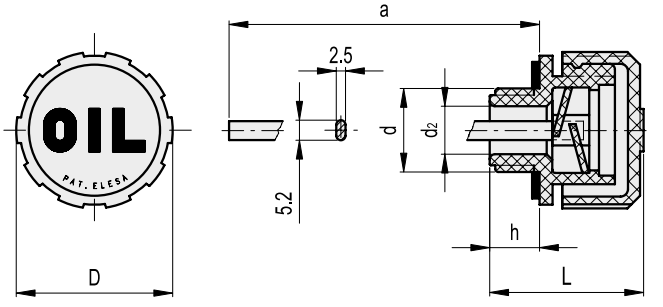
- **Cover and threaded connector**
  Polyamide based (PA) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
- **Colour**
  - Cover: RAL 2004 orange, semi-matte finish, marked "OIL".
  - Threaded connector: black, semi-matte finish.
- **Flat packing ring**
  NBR synthetic rubber.
- **Flat dipstick**
  Phosphatised steel. On request and for sufficient quantities dipstick can be supplied in different lengths and/or complete with MAX-MIN level lines.
- **Splash guard**
  Technopolymer.
- **Standard executions available**
  - **SFP+a**: without air filter (black splash guard).
  - **SFP+F+a**: D = 31, 42 and 57 with "tech-fil" air filter in zinc-plated steel wire (orange splash guard); D = 70 with "tech-foam" air filter in polyurethane foam mesh (polyester base), air filtration 40 µ (grey splash guard).
  - **SFP.70-BA+F+a**: with "tech-foam" air filter in polyurethane foam mesh (polyester base), air filtration 40 µ (grey splash guard) and zinc-plated steel sheet bayonet and chrome-plated steel safety chain.
- **Maximum continuous working temperature**
  120°C for execution without air filter or with "tech-fil" air filter.
  100°C for execution with "tech-foam" air filter.

Special executions on request *(For sufficient quantities)*
- Cover, RAL 2004 orange, without "OIL" mark.
- Black cover with or without "OIL" mark.

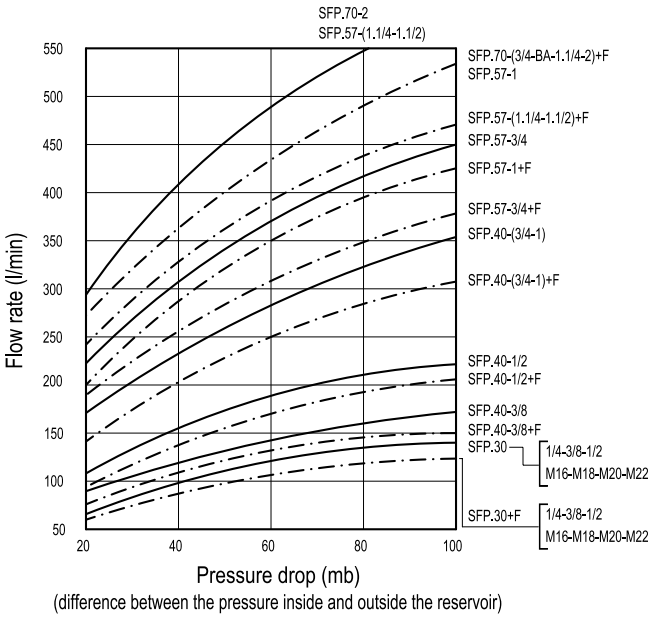
Features and applications
SFP+a breather caps come complete with splash guard device (ELESA originale design) that prevents oil loss and are particularly suitable for use where oil is violently agitated and could be splashed against the breather cap.

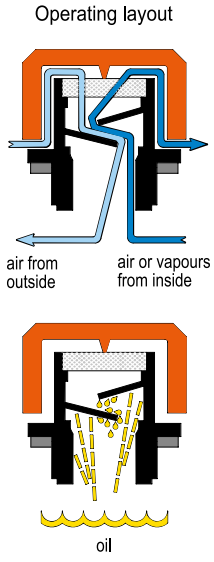
Technical data
Air flow rate for each model can be determined from the graph calculating the difference between the pressure inside and outside the reservoir.

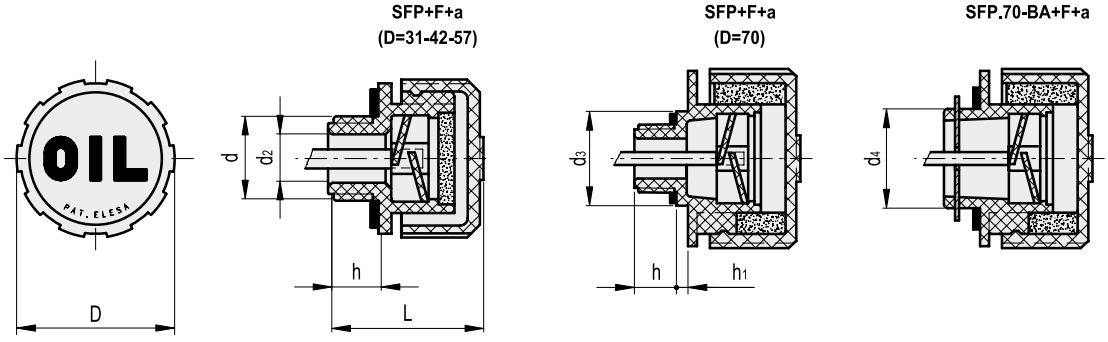
SFP+a



Standard Elements		Main dimensions						⚖
Code	Description	d	h	D	L	d2	a	g
53946	SFP.30-16x1.5+a	M16x1.5	9.5	31	29.5	10	188	30
53966	SFP.30-18x1.5+a	M18x1.5	9.5	31	29.5	10	188	30
53983	SFP.30-20x1.5+a	M20x1.5	9.5	31	29.5	12	188	31
53993	SFP.30-22x1.5+a	M22x1.5	9.5	31	29.5	12	188	31
53936	SFP.30-1/4+a	G 1/4	9.5	31	29.5	8	188	30
54011	SFP.30-3/8+a	G 3/8	9.5	31	29.5	10	188	30
54111	SFP.30-1/2+a	G 1/2	9.5	31	29.5	12	188	30
54211	SFP.40-3/4+a	G 3/4	11.5	42	36.5	18	184	42
54311	SFP.40-1+a	G 1	11.5	42	36.5	18	184	44
54411	SFP.57-1¼+a	G 1¼	16	57	44	32	184	63
54511	SFP.57-1½+a	G 1½	16	57	44	32	184	65
54877	SFP.70-2+a	G 2	17	70	59	23	179	106







Standard Elements		Main dimensions									⚖
Code	Description	d	h	D	L	d2	d3	d4	h1	a	g
53956	SFP.30-16x1.5+F+a	M16x1.5	9.5	31	29.5	10	-	-	-	188	34
53976	SFP.30-18x1.5+F+a	M18x1.5	9.5	31	29.5	10	-	-	-	188	34
53989	SFP.30-20x1.5+F+a	M20x1.5	9.5	31	29.5	12	-	-	-	188	32
53999	SFP.30-22x1.5+F+a	M22x1.5	9.5	31	29.5	12	-	-	-	188	33
53939	SFP.30-1/4+F+a	G 1/4	9.5	31	29.5	8	-	-	-	188	31
54031	SFP.30-3/8+F+a	G 3/8	9.5	31	29.5	10	-	-	-	188	33
54131	SFP.30-1/2+F+a	G 1/2	9.5	31	29.5	12	-	-	-	188	34
54231	SFP.40-3/4+F+a	G 3/4	11.5	42	36.5	18	-	-	-	184	50
54331	SFP.40-1+F+a	G 1	11.5	42	36.5	18	-	-	-	184	50
54431	SFP.57-1¼+F+a	G 1¼	16	57	44	32	-	-	-	184	75
54531	SFP.57-1½+F+a	G 1½	16	57	44	32	-	-	-	184	75
54853	SFP.70-3/4+F+a	G 3/4	15	70	63	16	35	-	6	173	100
54863	SFP.70-1¼+F+a	G 1¼	17	70	59	23	-	-	-	179	105
54879	SFP.70-2+F+a	G 2	17	70	59	23	-	-	-	179	110
54883	SFP.70-BA+F+a	-	14	70	56	23	-	39	-	179	100

SFP-EX

ELESA Original design

Breather caps with splash guard

- **Material**
  Polyamide based (PA) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
  - Cover: RAL 2004 orange, semi-matte finish, marked "OIL".
  - Threaded connector: black colour, semi-matte finish.
- **Flat packing ring**
  NBR synthetic rubber.
- **Splash guard**
  Technopolymer.
- **Standard executions**
  - **SFP-EX**: without air filter (black splash guard).
  - **SFP+F-EX**: with "tech-foam" air filter in polyurethane foam mesh (polyester base), air filtration 40 µ (grey splash guard).
- **ATEX directive compliance**
  The breather caps of the SFP-EX series comply with Health and Safety Requirements intended in 94/9/EC ATEX European Directive (explosive atmospheres) for equipments in Group II, category 2GD.
  II 2 G D IIB T6, marked on the SFP-EX breather caps, represents the identification according to ATEX directive.
  II: group of substances for which the product is suitable
  2: identification of the category
  G: identification of the type of explosive atmosphere (Gases or vapours)
  D: identification of the type of explosive atmosphere (Dust)
  IIB: group of explosive gases
  T6: temperature class
  Ambient and/or fluid temperature: -30 ÷ +80°C
  The declaration of conformity to European Directives of this product is available and it is part of the product itself.

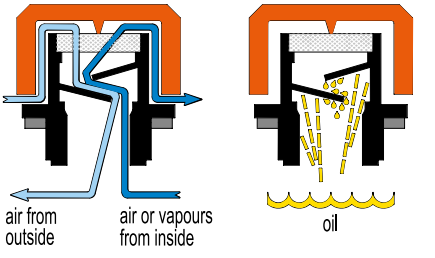
Features and applications

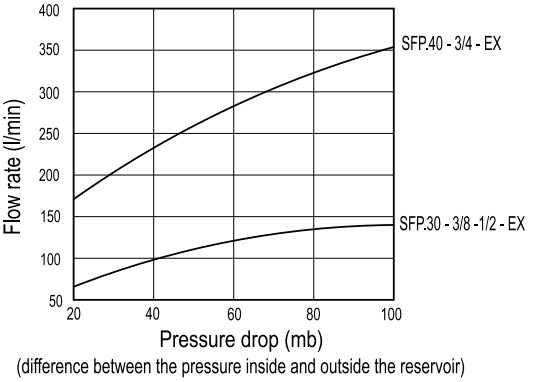
SFP-EX breather caps come complete with splash guard device (ELESA original design) that prevents oil loss and are particularly suitable for use where oil is violently agitated and could be splashed against breather cap.

Technical data

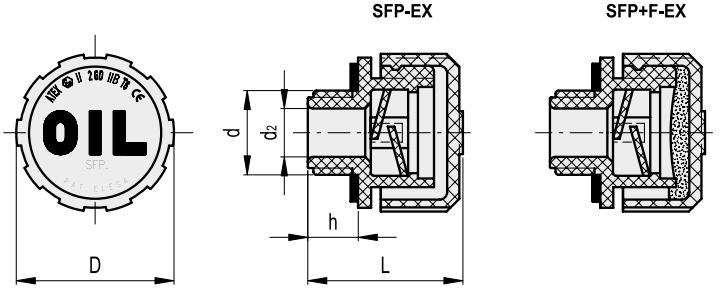
Air flow rate for each model can be determined from the graph calculating the difference between the pressure inside and outside the reservoir.

Operating layout





(difference between the pressure inside and outside the reservoir)



Standard Elements		Main dimensions					⚖
Code	Description	d	h	D	L	d2	g
54001-EX	SFP.30-3/8-EX	G 3/8	9.5	31	29.5	10	11
54101-EX	SFP.30-1/2-EX	G 1/2	9.5	31	29.5	12	11
54201-EX	SFP.40-3/4-EX	G 3/4	11.5	42	36.5	18	22

Standard Elements		Main dimensions					⚖
Code	Description	d	h	D	L	d2	g
54022-EX	SFP.30-3/8+F-EX	G 3/8	9.5	31	29.5	10	13
54122-EX	SFP.30-1/2+F-EX	G 1/2	9.5	31	29.5	12	15
54222-EX	SFP.40-3/4+F-EX	G 3/4	11.5	42	36.5	18	28

SFP+a-EX

ELESA Original design

Breather caps with splash guard and flat dipstick

- **Material**
  Polyamide based (PA) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
  - Cover: RAL 2004 orange, semi-matte finish, marked "OIL".
  - Threaded connector: black colour, semi-matte finish.
- **Flat packing ring**
  NBR synthetic rubber.
- **Flat dipstick**
  Phosphatised steel. On request dipstick can be supplied in different lengths and/or complete with MAX-MIN level lines.
- **Splash guard**
  Technopolymer.
- **ATEX directive compliance**
  The breather caps of the SFP+a-EX series comply with Health and Safety Requirements intended in 94/9/EC ATEX European Directive (explosive atmospheres) for equipments in Group II, category 2GD.
  II 2 G D IIB T6, marked on the SFP-EX breather caps, represents the identification according to ATEX directive.
  II: group of substances for which the product is suitable
  2: identification of the category
  G: identification of the type of explosive atmosphere (Gases or vapours)
  D: identification of the type of explosive atmosphere (Dust)
  IIB: group of explosive gases
  T6: temperature class
  Ambient and/or fluid temperature: -30 ÷ +80°C
  The declaration of conformity to European Directives of this product is available and it is part of the product itself.

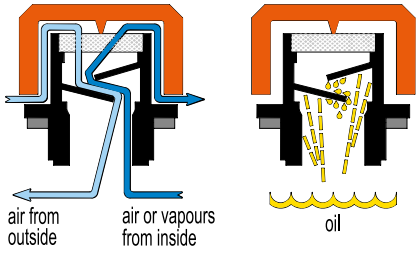
Features and applications

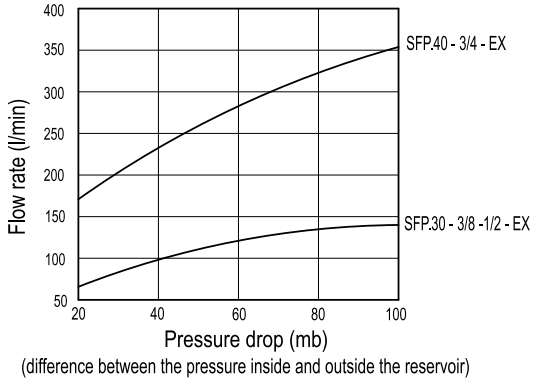
SFP+a-EX breather caps come complete with splash guard device (ELESA original design) that prevents oil loss and are particularly suitable for use where oil is violently agitated and could be splashed against breather cap.

Technical data

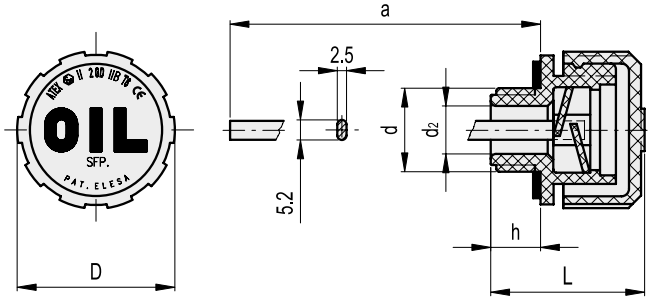
Air flow rate for each model can be determined from the graph calculating the difference between the pressure inside and outside the reservoir.

Operating layout





(difference between the pressure inside and outside the reservoir)



Standard Elements		Main dimensions						⚖
Code	Description	d	h	D	L	d2	a	g
54011-EX	SFP.30-3/8+a-EX	G 3/8	9.5	31	29.5	10	188	30
54111-EX	SFP.30-1/2+a-EX	G 1/2	9.5	31	29.5	12	188	30
54211-EX	SFP.40-3/4+a-EX	G 3/4	11.5	42	36.5	18	184	42

SFN-PF+F

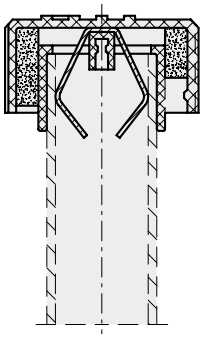
ELESA Original design

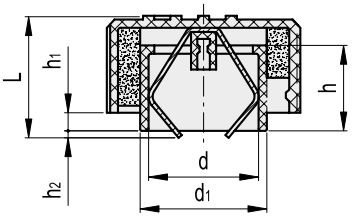
Breather cap push-fit

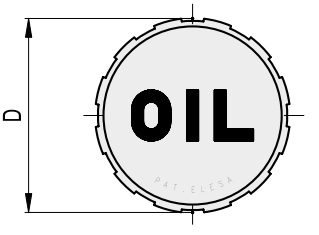
RoHS PA +100°C -30°C

- **Cover and threaded connector**
  Polyamide based (PA) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
- **Colour**
  - Cover: RAL 2004 orange, semi-matte finish, marked "OIL".
  - Threaded connector: black, semi-matte finish.
- **Assembly**
  Push-fit on pipes with max outside diameter of 39 mm and min inside diameter of 32 mm.
- **Clip**
  Black-oxide steel.
- **Ring-shaped air filter**
  "Tech-foam" polyurethane foam mesh (polyester base), air filtration 40 µ.
- **Maximum continuous working temperature**
  100°C.

Special executions on request *(For sufficient quantities)*
- Cover, RAL 2004 orange, without "OIL" mark.
- Black cover with or without "OIL" mark.







Standard Elements		Main dimensions							⚖
Code	Description	d	h	D	L	d1	h1	h2	g
54761	SFN.70-PF+F	39.5	27.5	70	43	45.5	2.5	6.5	67

SFV.

ELESA Original design

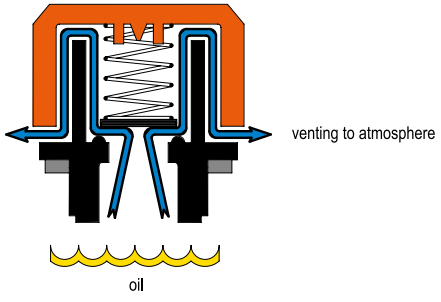
Valve breather caps

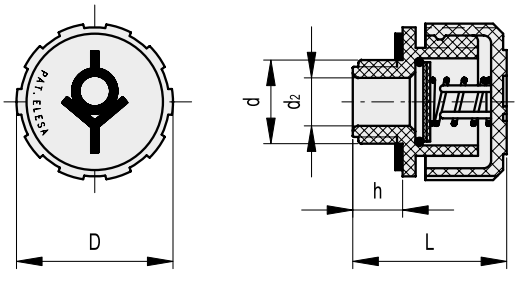
RoHS PA +100°C -30°C

- **Cover and threaded connector**
  Polyamide based (PA) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
- **Colour**
  - Cover: RAL 2004 orange, semi-matte finish with graphic symbol "valve".
  - Threaded connector: black, semi-matte finish.
- **Flat packing ring**
  NBR synthetic rubber.
- **Safety valve**
  Technopolymer sealing disk with NBR synthetic rubber O-ring and stainless steel spring.
  - SFV.10 mb: valve opens when pressure exceeds 0.010 bar.
  - SFV.100 mb: valve opens when pressure exceeds 0.100 bar.
- **Maximum continuous working temperature**
  100°C.

Special executions on request *(For sufficient quantities)*
Black cover.

Features and applications
SFV. valve breather caps are particularly suitable for all those applications (speed reducers, variators or compressors) when the internal air pressure must not exceed a certain value (10 or 100 mb).
In these cases, the safety valve of the cap allows the expulsion of the exceeding air in the reservoir, thus re-establishing the pressure values for which the valve is set.
Sealing disc prevents dust from getting in and oil-losses.





Standard Elements			Main dimensions					⚖
10 mb	100 mb	Description						
Code			d	h	D	L	d2	g
54611	54616	SFV.16x1.5*	M16x1.5	9.5	31	29.5	10	12
54621	54626	SFV.18x1.5*	M18x1.5	9.5	31	29.5	10	12
54631	54636	SFV.20x1.5*	M20x1.5	9.5	31	29.5	10	12
54641	54646	SFV.22x1.5*	M22x1.5	9.5	31	29.5	10	13
54651	54656	SFV.1/4*	G 1/4	9.5	31	29.5	8	11
54661	54666	SFV.3/8*	G 3/8	9.5	31	29.5	10	12
54671	54676	SFV.1/2*	G 1/2	9.5	31	29.5	10	12
54681	54686	SFV.3/4*	G 3/4	11.5	42	36.5	17	23
54691	54696	SFV.1*	G 1	11.5	42	36.5	17	25

* Complete the description of the standard item needed by adding the valve opening pressure.

SFW.

ELESA Original design

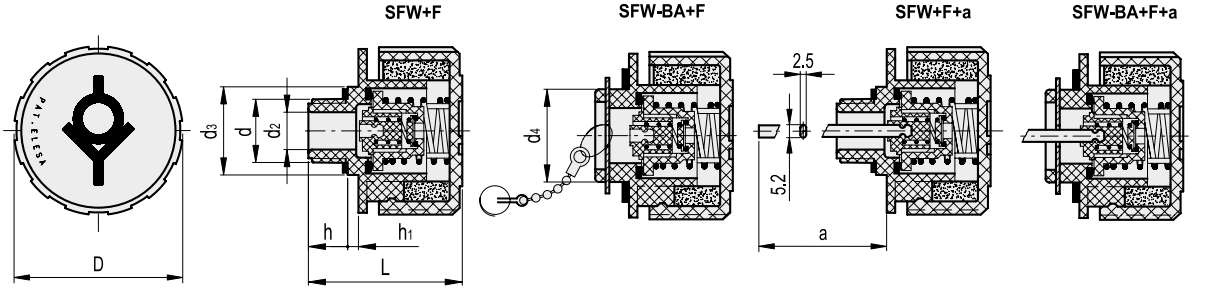
Double-valve pressurised breather caps

RoHS PA +100°C -30°C

- **Material**
  Polyamide based (PA) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
  - Cover: RAL 2004 orange, semi-matte fi nish, with graphic symbol "valve".
  - Threaded connector: black colour, semi-matte finish.
- **Flat packing ring**
  NBR synthetic rubber.
- **Overpressure valve**
  Technopolymer with NBR synthetic rubber O-ring and stainless steel spring.
  Set at around 0.350 bar (on request 0.700 bar).
- **Suction valve**
  Technopolymer sealing disk with NBR synthetic rubber O-ring and stainless steel spring.
  Set at around 0.030 bar.
- **Ring-shaped air filter**
  "Tech-foam" polyurethane foam mesh (polyester base), air filtration 40 µ.
- **Flat dipstick**
  Flat section phosphatised steel.
  On request and for sufficient quantities dipstick can be supplied in different lengths and/or complete with MAX-MIN level lines.
- **Standard executions available**
  - **SFW+F**: without fl at dipstick.
  - **SFW-BA+F**: with zinc-plated steel sheet bayonet, without fl at dipstick. Chrome-plated steel safety chain.
  - **SFW+F+a**: without fl at dipstick.
  - **SFW-BA+F+a**: with zinc-plated steel sheet bayonet and fl at dipstick. Chrome-plated steel safety chain.
- **Maximum continuous working temperature**
  100°C.

Special executions on request

- Black cover.
- Threaded connector also with NPT thread (National Taper pipe Thread - AINSI-ASME B1-20) for the codes marked with # in the table.



Standard Elements		Main dimensions								⚖
Code	Description	d	h	D	L	d2	d3	d4	h1	g
54801	SFW.57-3/4+F-350 mb	G 3/4	13	57	48	16	35	-	6	67
54911#	SFW.70-3/4+F-350 mb	G 3/4	15	70	63	16	35	-	6	98
54921	SFW.70-1¼+F-350 mb	G 1¼	17	70	59	25	-	-	-	101
54931	SFW.70-2+F-350 mb	G 2	17	70	59	25	-	-	-	108
54941	SFW.70-BA+F-350 mb	-	14	70	56	25	-	39	-	105

Standard Elements		Main dimensions									⚖
Code	Description	d	h	D	L	d2	d3	d4	h1	a	g
54913#	SFW.70-3/4+F+a-350 mb	G 3/4	15	70	63	16	35	-	6	188	117
54923	SFW.70-1¼+F+a-350 mb	G 1¼	17	70	59	25	-	-	-	195	120
54943	SFW.70-BA+F+a-350 mb	-	14	70	56	25	-	39	-	195	124

Types available on request with NPT thread (National Taper pipe Thread - ANSI-ASME B1-20).

Features

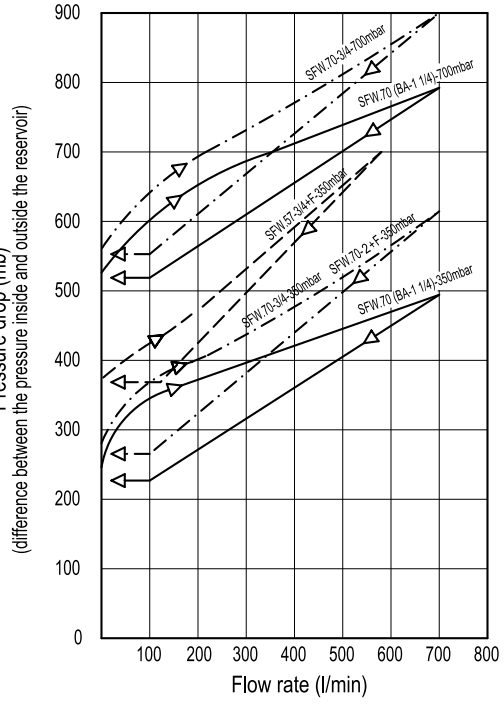
The use of SFW. pressurised breather caps which create a pressure plenum chamber right above the oil level within tested limit conditions, in order to avoid any reservoir deformation, offers the following advantages:

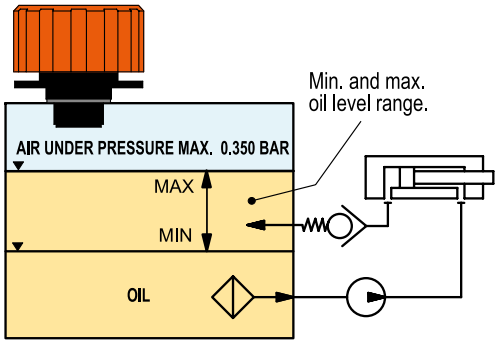
- reduces reservoir air volume intake keeping clean oil and filter
- improves suction pump action during working conditions reducing cavitation phenomenon
- prevents fluid leakage when the system is part of a mobile unit
- reduces foam in fluid.

Technical data

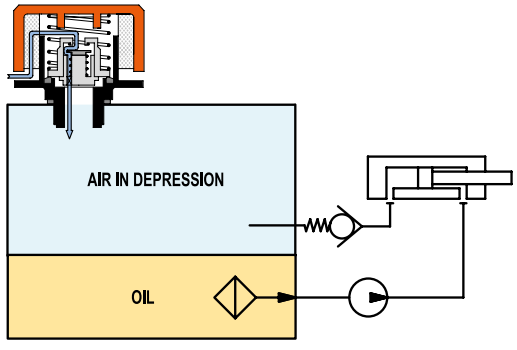
Air flow rate for each model can be determined from the graph calculating the difference between the pressure inside and outside the reservoir.

SFW. pressurised breather cap functioning in a hydraulic circuit

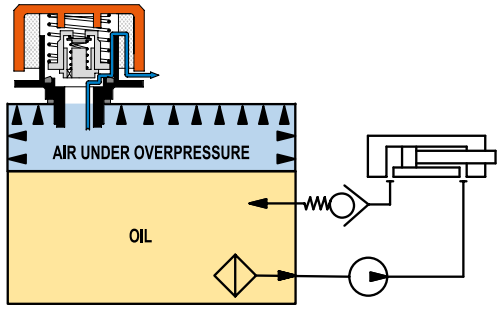




Normal working conditions



When in the reservoir a depression under 0.030 bar is produced, a flux of air entering the reservoir through the suction valve takes place.



When in the reservoir an over pressure exceeding 0.350 (or 0.700) bar is produced, a flux of air is discharged through the safety valve.

SFW-VP

ELESA Original design

Double-valve pressurised breather caps vandal-proof

PA POM +100°C -30°C RoHS

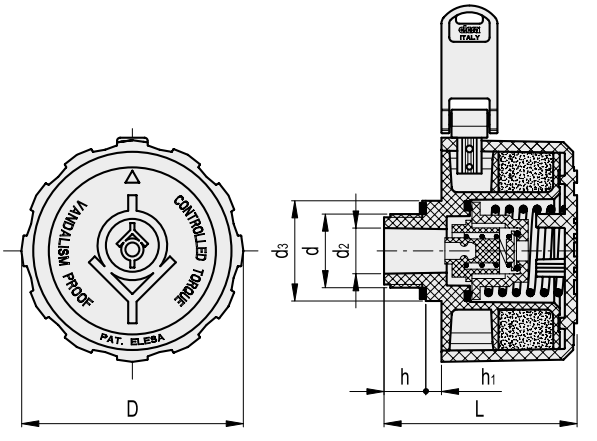
- **Cover**
  Polyamide based (PA) technopolymer with graphic symbol "double valve". Resistant to solvents, oils, greases and other chemical agents.
- **Threaded connector**
  Acetal resin based (POM) technopolymer.
- **Colour**
  Black, matte finish.
- **Flat packing ring**
  NBR synthetic rubber.
- **Safety valve**
  Technopolymer with NBR synthetic rubber O-ring and stainless steel spring. Set at around 0.350 bar (0.700 bar on request).
- **Suction valve**
  Technopolymer sealing disk with NBR synthetic rubber O-ring and stainless steel spring.
  Set at around 0.030 bar.
- **Ring-shaped air filter**
  "Tech-foam" polyurethane foam mesh (polyester base), air filtration 10 µ.
- **Folding key**
  Acetal resin-based (POM) technopolymer, red colour, with stainless steel anti-intrusion-profile insert. On request and for sufficient quantities it can be supplied in black colour too.
- **Maximum continuous working temperature**
  100°C.
- **"Vandal-proof" safety device** (ELESA patent)
  The "vandal-proof" safety device (ELESA patent) is especially designed to prevent the cap from being unscrewed without permission. It is provided with a "controlled-torque" mechanism to guarantee the best seal of the packing ring.

Special executions on request *(For sufficient quantities)*
Phosphatised steel flat dipstick.

Features
The use of SFW-VP pressurised breather cap (see working conditions example in the SFW. sheet (see page 54) which create a pressure plenum chamber right above the oil level within tested limit conditions, in order to avoid any reservoir deformation, offers the following advantages:
- reduces reservoir air volume intake keeping clean oil and filter
- improves suction pump action during working conditions reducing cavitation phenomenon
- prevents fluid leakage when the system is part of a mobile unit
- reduces foam in fluid.

Applications
SFW-VP pressurised breather caps are suitable for material handling equipment, machines for the agriculture sector and in general for those machines which remain unattended.
Thanks to its small dimensions, the key can be kept together with others (e.g. together with the starting key of the engine).
Moreover, when the cap is closed, the special coupling mechanism cap/connector allows an IP 65 class protection as to IEC 529 table.

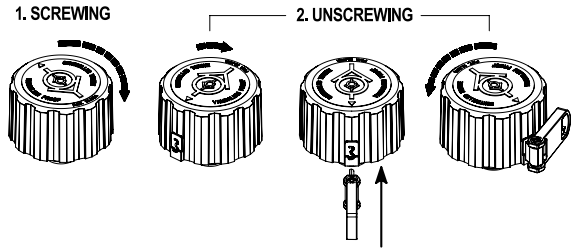
Technical data
Air flow rate for each model can be determined from the graph calculating the difference between the pressure inside and outside the reservoir.



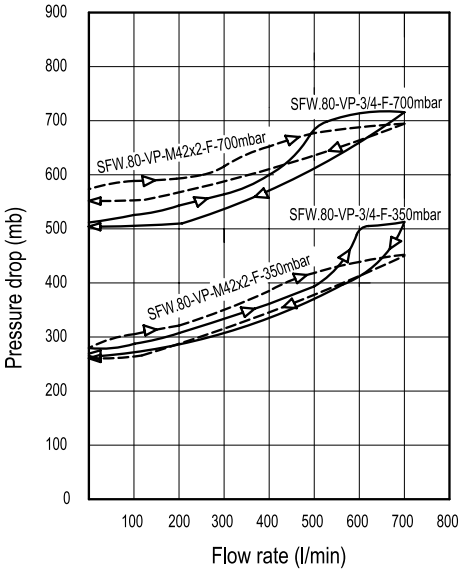
Standard Elements		Main dimensions							⚖
Code	Description	d	D	L	h	h1	d2	d3	g
54961	SFW.80-VP-3/4-F-350mb	G 3/4	80	68	15	5.5	16	36	140
54967	SFW.80-VP-M42x2-F-350mb	M42x2	80	74	21	4	32	47	150

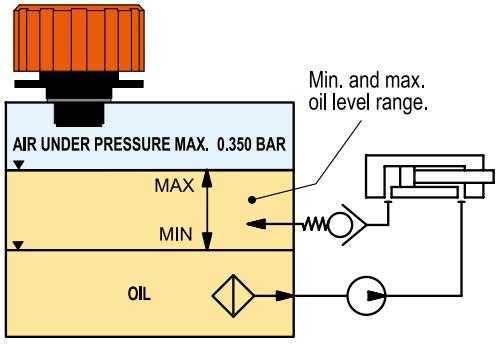
1. Screwing
Take out the key and screw the cap clockwise until the friction-click controlled torque mechanism is engaged so that to guarantee the best sealing of the packing ring. The maximum torque is reached at the first mechanism release (click). After that, the cap can neither be screwed (to protect the packing ring) nor unscrewed (to protect the cap from any tampering attempt).
WARNING: during screwing the key must not be inserted.

2. Unscrewing
Turn the cap clokwise until one of the two resistance points is reached. Only at one of these two positions the key, which couples the cover to the threaded connector, can be completely inserted and the cap can be unscrewed.

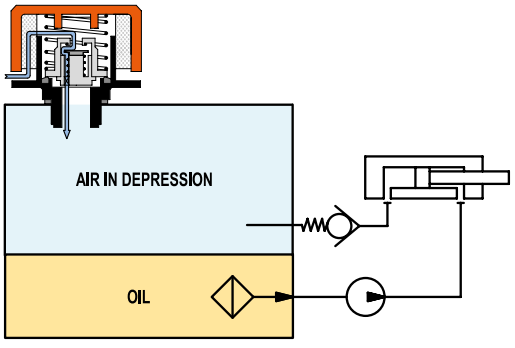


SFW-VP. pressurised breather cap functioning in a hydraulic circuit

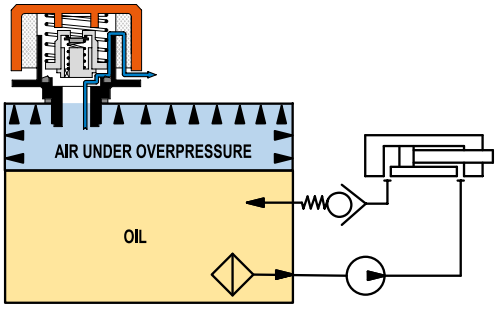




Normal working conditions



When in the reservoir a depression under 0.030 bar is produced, a flux of air entering the reservoir through the suction valve takes place.



When in the reservoir an over pressure exceeding 0.350 (or 0.700) bar is produced, a flux of air is discharged through the safety valve.

Breather caps or double-valve breather caps with threaded connector

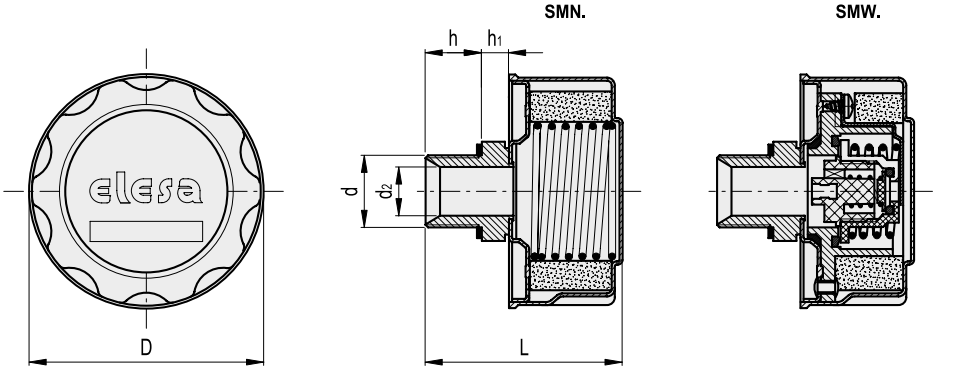
RoHS +100°C -30°C

- **Cover**
  Steel sheet, with chrome plating superficial treatment.
- **Flange**
  Zinc-plated steel sheet.
- **Threaded connector**
  Zinc-plated steel.
- **Flat packing ring**
  NBR synthetic rubber (only GAS execution).
- **Double-valve (execution SMW.)**
  Technopolymer with NBR synthetic rubber O-ring, stainless steel springs, fitted to the valve body by means of a bracket and 2 self-tapping zinc-plated steel screws.
  Assembly to the flange by means of 4 aluminium rivets.
  Safety valve set at around 0.350 bar (0.700 bar on request).
  Suction valve set at around 0.030 bar.
- **Ring-shaped air filter**
  Tech-foam 40 µ.
- **Filter setting spring (only for SMN.)**
  Zinc-plated steel.
- **Maximum continuous working temperature**
  100°C.

Special executions on request *(For sufficient quantities)*
Dipstick for fluid level indication (only for SMW.).

Features and applications
SMN. and SMW. breather caps can be used for application on tanks containing oil fluids.
Double-valve breather cap SMW. creates a pressure plenum chamber right above the oil level within the limit conditions in order to avoid any reservoir deformation.
Advantages:
- it reduces reservoir air volume intake keeping clean fluid and filter;
- it improves suction pump action under working conditions reducing cavitation phenomenon;
- it prevents fluid leakage when the system is part of a mobile unit;
- it reduces foam in fluid.

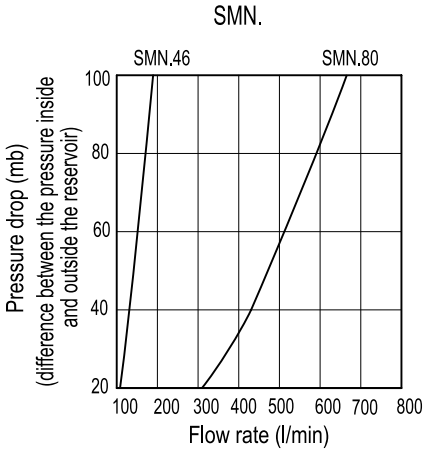
Technical data
Air flow rate for the different executions of breather caps can be obtained from the diagram on the basis of the difference of air pressure inside and outside the reservoir.

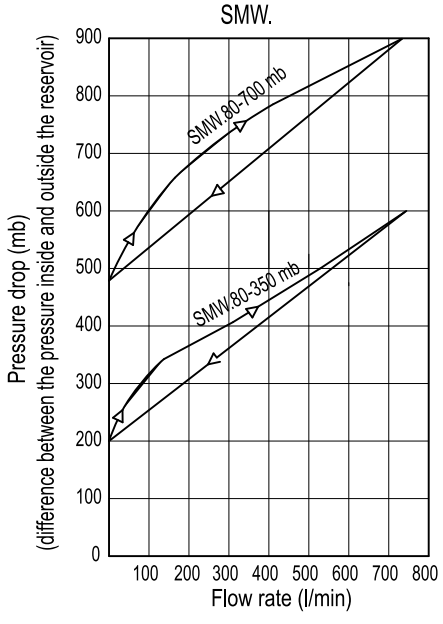


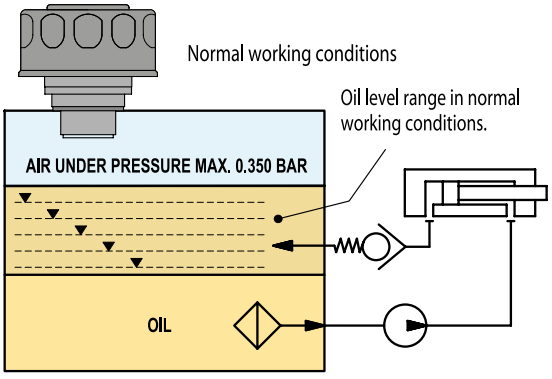
Standard Elements		Main dimensions						
Code	Description	d	h	D	L	d2	h1	g
156833	SMN.46-1/4-F40	G 1/4	10	47	51	7	5	57
156883	SMN.80-3/4-F40	G 3/4	16	81	70	17	12	239

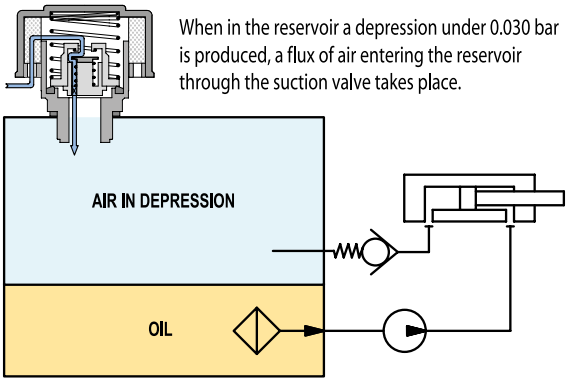
Standard Elements		Main dimensions						
Code	Description	d	h	D	L	d2	h1	g
156983	SMW.80-3/4-F40-350mb	G 3/4	16	81	70	17	12	308

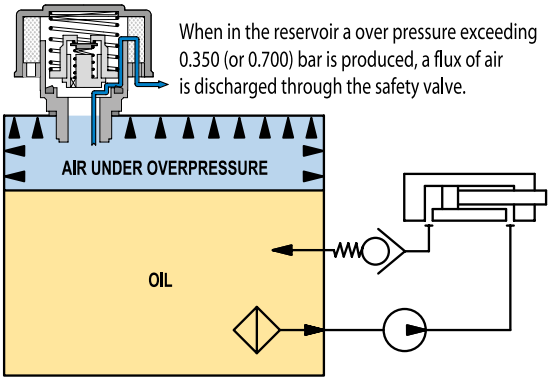
SMW. pressurised breather cap functioning in a hydraulic circuit











SMN-BA SMW-BA

Breather caps or double-valve breather caps with bayonet assembly

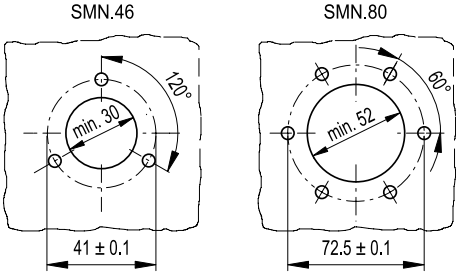
- **Cover**
  Steel sheet, with chrome plating superficial treatment.
- **Flange**
  Zinc-plated steel sheet.
- **Double-valve (execution SMW.BA)**
  Technopolymer with NBR synthetic rubber O-ring, stainless steel springs, fitted to the valve body by means of a bracket and 2 self-tapping zinc-plated steel screws. Assembly to the flange by means of 4 aluminium rivets.
  Safety valve set at around 0.350 bar (0.700 bar on request).
  Suction valve set at around 0.030 bar.
- **Bayonet and flange with bayonet**
  Zinc-plated steel sheet.
- **Safety chain**
  Brass.
- **Washers**
  - **Execution SMN.46-BA**: two flat packing rings in rubber-impregnated cork and one in NBR synthetic rubber.
  - **Execution SMN.80-BA SMW.80-BA**: three flat packing rings in rubber-impregnated cork.
- **Filtration basket**
  Zinc-plated steel, degree of filtration 800 µ.
- **Assembly**
  By means of six glossy zinc-plated steel screws with screwdriver slot head M5x12, supplied.
- **Ring-shaped air filter**
  Tech-foam 40 µ.
- **Filter setting spring (only for SMN.BA)**
  Zinc-plated steel.
- **Maximum continuous working temperature**
  100°C.

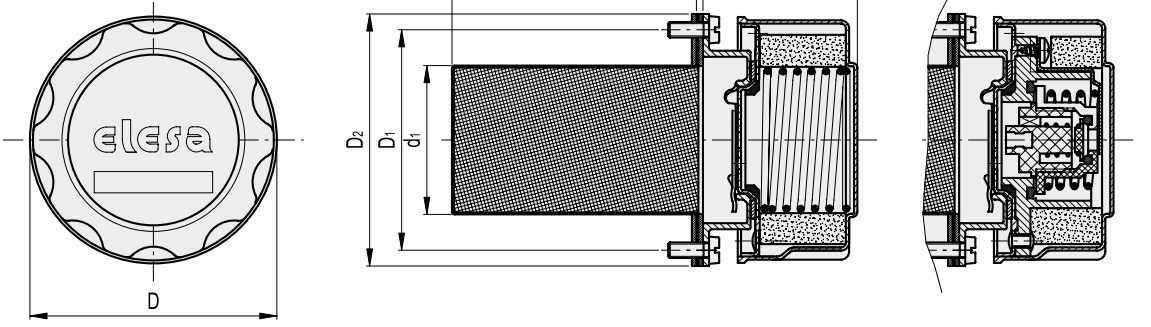
Special executions on request *(For sufficient quantities)*
Dipstick for fluid level indication (only for SMW.BA).

Features and applications
SMN.BA and SMW.BA breather caps can be used on tanks containing oil fluids. Double-valve breather caps SMW.BA with bayonet assembly creates a pressure plenum chamber right above the oil level within the limit conditions in order to avoid any reservoir deformation.
Advantages:
- it reduces reservoir air volume intake keeping clean fluid and filter;
- it improves suction pump action under working conditions reducing cavitation phenomenon;
- it prevents fluid leakage when the system is part of a mobile unit;
- it reduces foam in fluid.

Technical data
Air flow rate for the different executions of breather caps can be obtained from the diagram on the basis of the difference of air pressure inside and outside the reservoir. Tests carried out without filtration basket.

Drilling templates

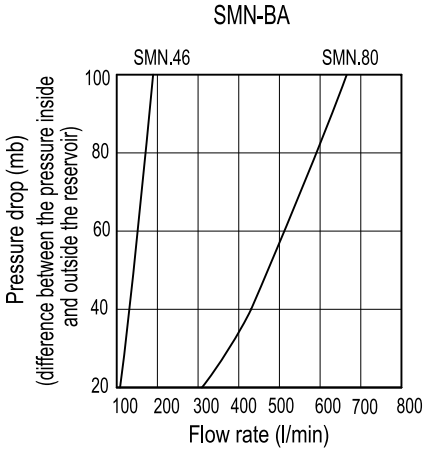


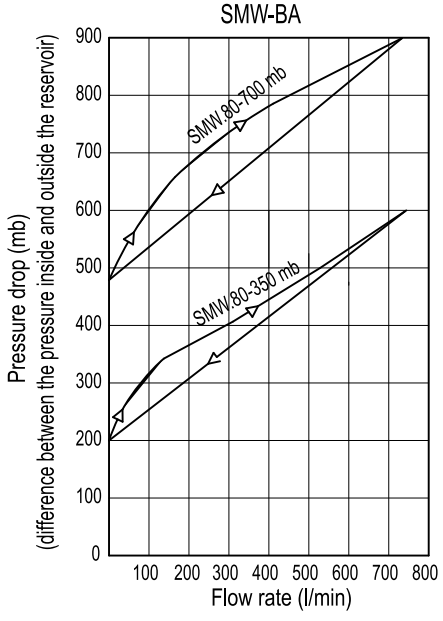


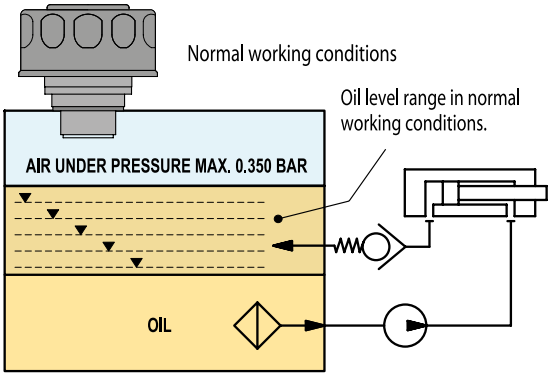
Standard Elements		Main dimensions						⚖
Code	Description	D	L	L1	D1	D2	d1	g
156836	SMN.46-BA-F40	47	42	66	40	52	27	91
156886	SMN.80-BA-F40	81	55	80	72	83	49	370

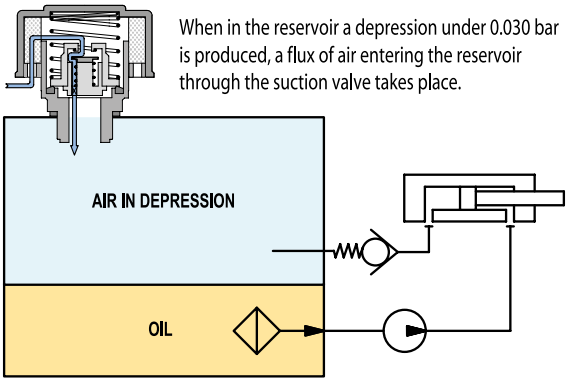
Standard Elements		Main dimensions						⚖
Code	Description	D	L	L1	D1	D2	d1	g
156986	SMW.80-BA-F40-350mb	81	55	80	72	83	49	410

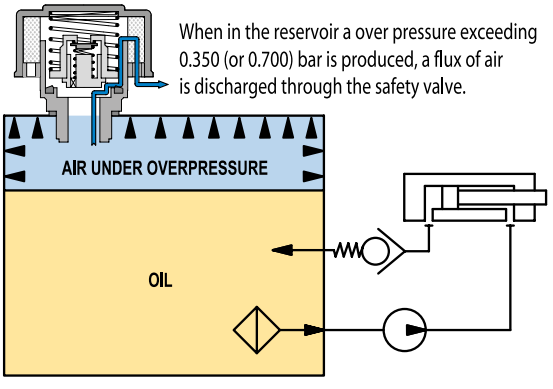
SMW. pressurised breather cap functioning in a hydraulic circuit











FRB+C

ELESA Original design

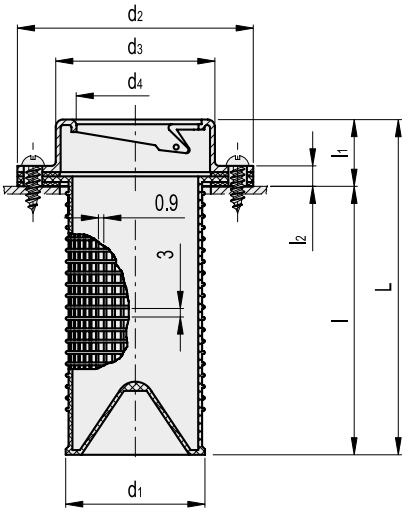
Flange for bayonet cap

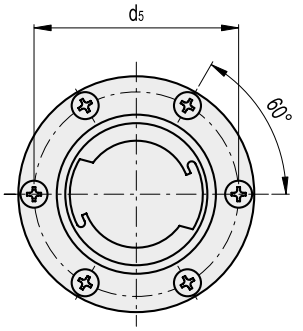
RoHS PP +90° 0°

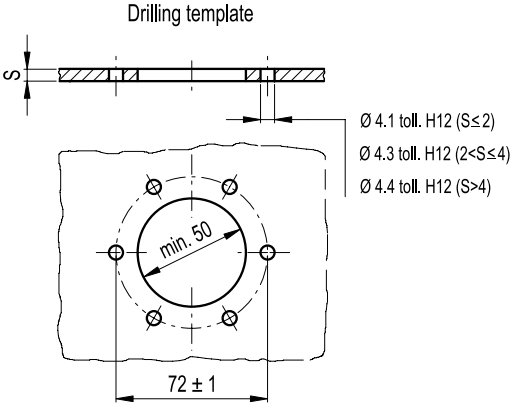
- **Flange**
  Zinc-plated steel with bayonet attachement.
- **Basket**
  Polypropylene based (PP) technopolymer, black colour. Resistant to solvents, oils, greases and other chemical agents.
- **Flat gaskets**
  Cork impregnated MGS based rubber.
- **Assembly**
  By means of six zinc-plated steel self-tapping screws TC-N10 (Ø 4.8x19) UNI 6951-DIN 7971, included in the supply.

Special executions on request (For sufficient quantities)
Bayonet flange without basket (execution FRB).

Note
The breather cap to be coupled to the flange is not included.
Bretaher caps type SFN. (see page 44), SFP. (see page 46), SFW. (see page 54) can be used depending on the customer's requirements.







Standard Elements		Main dimensions									⚖
Code	Description	d4	L	d1	d2	d3	d5	l	l1	l2	g
9201	FRB+C	39	114.5	49	83	58	72	94.5	20	7	125

FRF+C

ELESA Original design

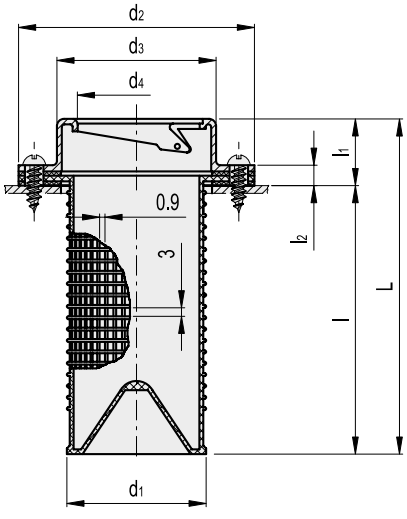
Flange for threaded cap

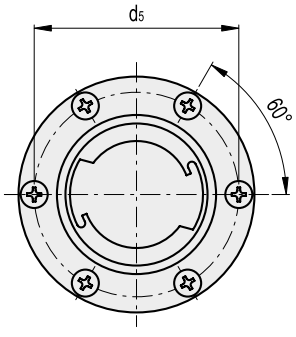
RoHS PA PP +90° 0°

- **Flange**
  Glass-fibre reinforced polyamide based (PA) technopolymer with threaded connector. Resistant to solvents, oils, greases and other chemical agents.
- **Basket**
  Polypropylene based (PP) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
- **Colour**
  Black, matte finish.
- **Flat gaskets**
  Cork impregnated MGS based rubber.
- **Assembly**
  By means of six zinc-plated steel self-tapping screws TC-N10 (Ø 4.8x19) UNI 6951-DIN 7971, included in the supply.

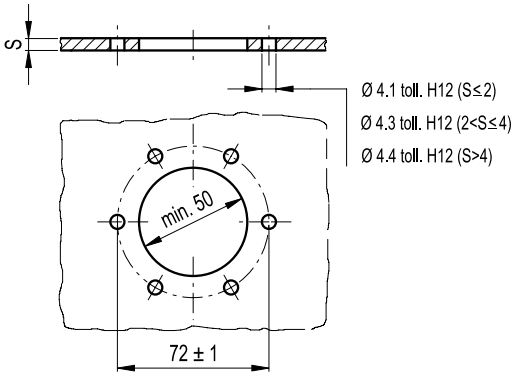
Special executions on request (For sufficient quantities)
Threaded flange without basket (execution FRF).

Note
The breather cap to be coupled to the flange is not included.
Breather caps type SFN. (see page 44) SFP. (see page46), SFW. (see page 54) can be used depending on the customer's requirements.





Drilling template



Standard Elements		Main dimensions									⚖
Code	Description	d	L	d1	d2	d3	d5	l	l1	l2	g
9101	FRF+C	G 1¼	118	49	83	56	72	93.5	24.5	10.5	105

PLRB+C

ELESA Original design

Side mount for bayonet cap

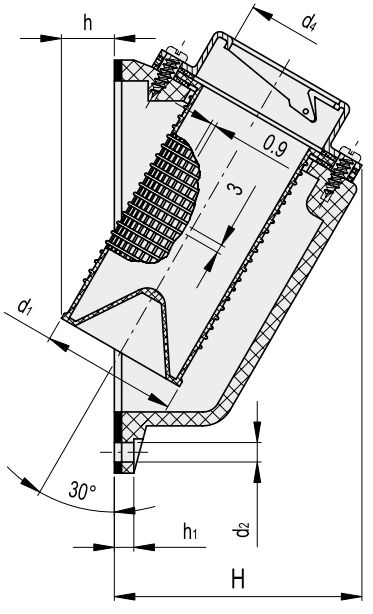
RoHS PA PP +100°C 0°C

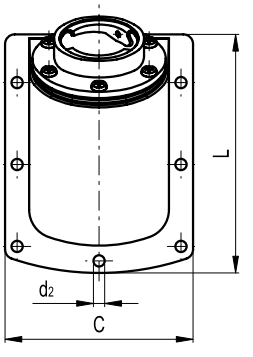
- **Mount**
  Polyamide based (PA) technopolymer with NBR synthetic rubber gasket. Resistant to solvents, oils, greases and other chemical agents.
- **Flange**
  Zinc-plated steel with flat gasket in cork impregnated MGS based rubber.
- **Basket**
  Polypropylene based (PP) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
- **Colour**
  Black, matte finish.
- **Assembly**
  - Flange and basket are fitted to the mount by means of six zinc-plated steel self-tapping screws TC-N10 (Ø 4.8x19) UNI 6951-DIN 7971, included in the supply.
  - The mount is fitted to the reservoir by means of seven M6 screws and relative washers (not included).

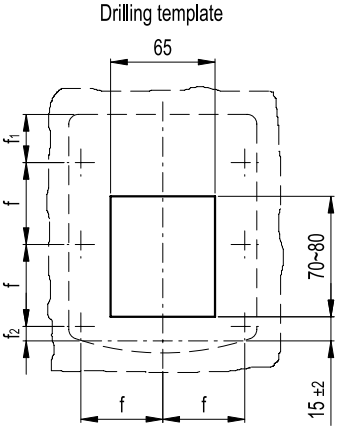
  Maximum torque recommended: 4 Nm.

Special executions on request (For sufficient quantities)
Side mount bayonet style flange without basket (execution PLRB).

Note
The breather cap to be coupled to the flange is not included.
Breather caps type SFN. (see page 44), SFP. (see page 46), SFW. (see page 54) can be used depending on customer's requirements.







Standard Elements		Main dimensions											⚖
Code	Description	d4	L	C	H	d1	d2	h	h1	f	f1	f2	g
49401	PLRB+C	39	148.5	117	90	49	7	18	7	51	30	9	355

PLRF+C

ELESA Original design

Side mount for threaded cap

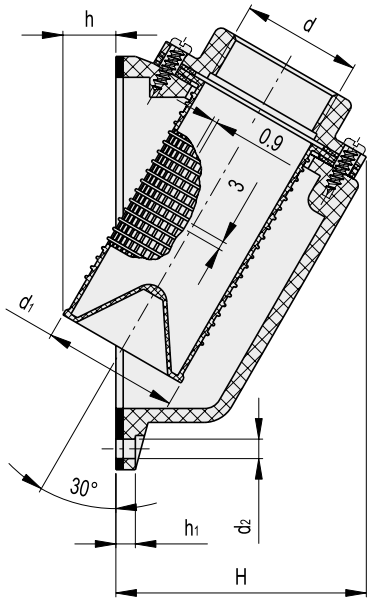
RoHS PA PP +100°C 0°C

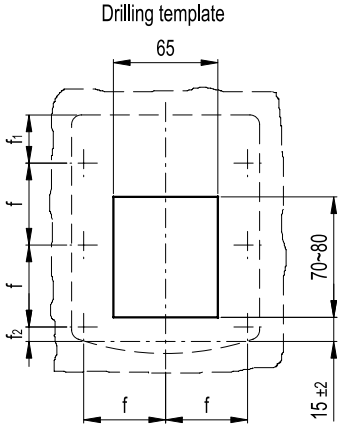
- **Mount**
  Polyamide based (PA) technopolymer with NBR synthetic rubber gasket. Resistant to solvents, oils, greases and other chemical agents.
- **Flange**
  Glass-fibre reinforced polyamide based (PA) technopolymer with threaded connector. Flat gasket in cork impregnated MGS based rubber.
- **Basket**
  Polypropylene based (PP) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
- **Colour**
  Black, matte finish.
- **Assembly**
  - Flange and basket are fitted to the mount by means of six zinc-plated steel self-tapping screws TC-N10 (Ø 4.8x19) UNI 6951-DIN 7971, included in the supply.
  - The mount is fitted to the reservoir by means of seven M6 screws and relative washers (not included).

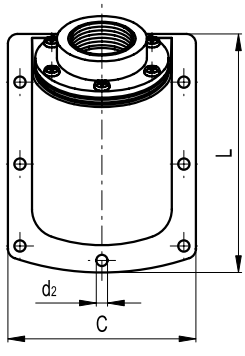
  Maximum recommended torque: 4 Nm.

Special executions on request *(For sufficient quantities)*
Side mount threaded style flange without basket (execution PLRF).

Note
The breather cap to be coupled to the flange is not included.
Breather caps type SFN. (see page 44), SFP. (see page 46), SFW. (see page 54) can be used depending on customer's requirements.







Standard Elements		Main dimensions											⚖
Code	Description	d	L	C	H	d1	d2	h	h1	f	f1	f2	g
49411	PLRF+C	G 1¼	148.5	117	92	49	7	18	7	51	30	9	335

HGFT.

ELESA Original design

Oil level indicators

RoHS PA PA-T AR +100°C -30°C

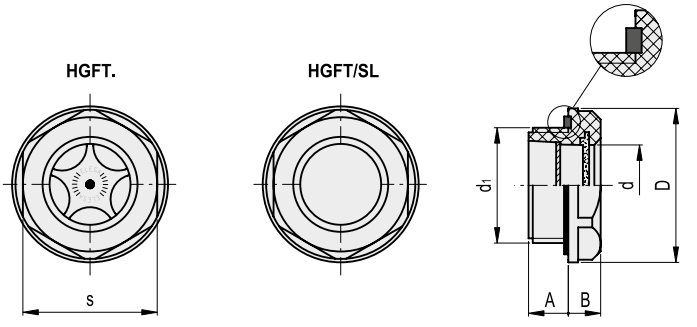
- **Material**
  Polyamide based (PA) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
- **Colour**
  Black or red, glossy finish (HGFT/SL only black colour).
- **Window**
  Transparent polyamide based (PA-T/AR) technopolymer. Resistant to alcohol, solvents, oils with additives, greases, acids and alkali.
- **Flat packing ring**
  NBR synthetic rubber.
- **Standard executions**
  - **HGFT.**: with matte anodised aluminium star-shaped contrast screen with red central level point.
  - **HGFT/SL**: without contrast screen.
- **Maximum continuous working temperature**
  100°C at 3 bar pressure.

Accessories on request

Brass nut type GH. (see page 77) for fitting to reservoirs with wall thickness smaller than 5 mm.

Note

For use with fluids containing special additives, please contact ELESA Sales Department.



* Complete with colour index, example: 14441 HGFT.10-3/8-C9

C9 RAL9005 C6 RAL3000

Standard Elements			Main dimensions						Tightening torque	⚖
C9	C6	Description								
Code			d1	A	B	D	d	s	[Nm]	g
14441	14444	HGFT.10-3/8*	G 3/8	8	7	24	11	22	4÷8	4
14461	14464	HGFT.13-1/2*	G 1/2	10	8.5	28	14.5	24	6÷8	6
14481	14484	HGFT.16-3/4*	G 3/4	9.5	8.5	35	18	32	8÷10	10
14521	14524	HGFT.21-1*	G 1	11	9.5	42.5	23	38	10÷12	15
14541	14544	HGFT.25-1¼*	G 1¼	11	9	50	30	46	12÷15	30
14561	14564	HGFT.40-2*	G 2	12	11	68	40	62	12÷15	60

Standard Elements		Main dimensions						Tightening torque	⚖
Code	Description	d1	A	B	D	d	s	[Nm]	g
14446	HGFT.10/SL-3/8	G 3/8	8	7	24	11	22	4÷8	3
14466	HGFT.13/SL-1/2	G 1/2	10	8.5	28	14.5	24	6÷8	5
14486	HGFT.16/SL-3/4	G 3/4	9.5	8.5	35	18	32	8÷10	9
14526	HGFT.21/SL-1	G 1	11	9.5	42.5	23	38	10÷12	14
14546	HGFT.25/SL-1¼	G 1¼	11	9	50	30	46	12÷15	29
14566	HGFT.40/SL-2	G 2	12	11	68	40	62	12÷15	59

HGFT-EX

ELESA Original design

Oil level indicators

- **Material**
  Polyamide based (PA) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
- **Colour**
  Black, glossy finish.
- **Window**
  Transparent polyamide based (PA-T/AR) technopolymer. Resistant to alcohol, solvents, oils with additives, greases, acids and alkali.
- **Flat packing ring**
  NBR synthetic rubber.
- **Standard executions**
  - **HGFT-EX**: with matte anodised aluminium star-shaped contrast screen with red central level point.
  - **HGFT/SL-EX**: without contrast screen.
- **ATEX directive compliance**
  The level indicators of the HGFT-EX series comply with Health and Safety Requirements intended in 94/9/EC ATEX European Directive (explosive atmospheres) for equipments in Group II, category 2GD. Level indicators have "kX" protection degree and can therefore be mounted in equipments protected by means of "immersion in liquid", without lowering protection degree.
  II 2 G D k T6 X, marked on the HGFT-EX level indicators, represents the identification according to ATEX directive.
  II: group of substances for which the product is suitable
  2: identification of the category
  G: identification of the type of explosive atmosphere (Gases or vapours)
  D: identification of the type of explosive atmosphere (Dust)
  kX: protection degree by means of immersion in liquid
  IIB: explosive gases group (only for HGFT.16)
  T6: temperature class
  Ambient and/or fluid temperature: -30 ÷ +80°C
  The declaration of conformity to European Directives of this product is available and it is part of the product itself.

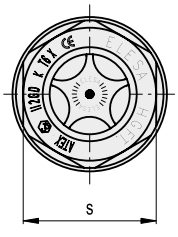
Accessories on request

Brass nut type GH. (see page 77) for fitting to reservoirs with wall thickness smaller than 5 mm.

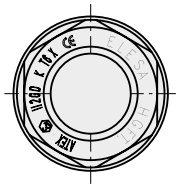
Note

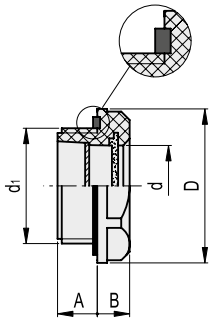
For use with fluids containing special additives, please contact ELESA Sales Department.

HGFT-EX



HGFT/SL-EX





Standard Elements		Main dimensions						Tightening torque	⚖
Code	Description	d1	A	B	D	d	s	[Nm]	g
14441-EX	HGFT.10-3/8-C9-EX	G 3/8	8	7	24	11	22	4÷8	4
14461-EX	HGFT.13-1/2-C9-EX	G 1/2	10	8.5	28	14.5	24	6÷8	6
14481-EX	HGFT.16-3/4-C9-EX	G 3/4	9.5	8.5	35	18	32	8÷10	10

Standard Elements		Main dimensions						Tightening torque	⚖
Code	Description	d1	A	B	D	d	s	[Nm]	g
14446-EX	HGFT.10/SL-3/8-C9-EX	G 3/8	8	7	24	11	22	4÷8	3
14466-EX	HGFT.13/SL-1/2-C9-EX	G 1/2	10	8.5	28	14.5	24	6÷8	5
14486-EX	HGFT.16/SL-3/4-C9-EX	G 3/4	9.5	8.5	35	18	32	8÷10	9

GN 743

Oil level indicators

RoHS +100°C -30°C

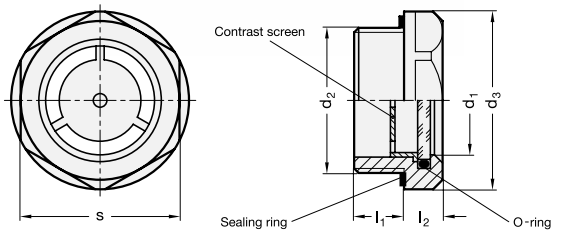
- **Material**
  Aluminium, fine turned finish.
  - Version **A**: with technopolymer (Polysulfon) contrast screen.
  - Version **B**: without contrast screen.
- **Window**
  Float-glass.
- **Flat packing ring**
  NBR synthetic rubber.
- **Maximum continuous working temperature**
  100°C.

Accessories on request

Brass nut type GH. (see page 77) for fitting to reservoirs with wall thickness smaller than 5 mm.

Features and applications

GN 743 oil level indicators can be used on pressurised oil tanks (oil-proof resistance data available on request). The natural glass window is resistant to scratches. The seal between the aluminium body and the glass window is guaranteed by a packing ring in NBR synthetic rubber.



Standard Elements	Main dimensions						⚖
Description	d1	d2	d3	l1	l2	s	g
GN 743-7-M14x1.5-A	7	M14x1.5	20	7.5	6.5	18	6
GN 743-11-M16x1.5-A	11	M16x1.5	22	8	7.5	20	8
GN 743-14-M20x1.5-A	14	M20x1.5	26	8.5	7.5	23	10
GN 743-18-M26x1.5-A	18	M26x1.5	32	9	8	30	18
GN 743-18-M27x1.5-A	18	M27x1.5	32	9	8	30	18
GN 743-24-M33x1.5-A	24	M33x1.5	40	11	8.5	36	26
GN 743-32-M40x1.5-A	32	M40x1.5	50	12	8.5	46	39
GN 743-32-M42x1.5-A	32	M42x1.5	50	12	9	46	43
GN 743-7-G1/4-A	7	G1/4	20	7.5	6.5	18	6
GN 743-11-G3/8-A	11	G 3/8	22	8	7.5	20	9
GN 743-14-G1/2-A	14	G 1/2	26	8.5	7.5	23	11
GN 743-18-G3/4-A	18	G 3/4	32	9	8	30	18
GN 743-24-G1-A	24	G 1	40	11	8.5	36	26
GN 743-32-G1¼-A	32	G 1¼	50	12	9	46	42
GN 743-32-G1½-A	32	G 1½	60	13	9	55	45
GN 743-7-M14x1.5-B	7	M14x1.5	20	7.5	6.5	18	6
GN 743-11-M16x1.5-B	11	M16x1.5	22	8	7.5	20	8
GN 743-14-M20x1.5-B	14	M20x1.5	26	8.5	7.5	23	10
GN 743-18-M26x1.5-B	18	M26x1.5	32	9	8	30	18
GN 743-18-M27x1.5-B	18	M27x1.5	32	9	8	30	18
GN 743-24-M33x1.5-B	24	M33x1.5	40	11	8.5	36	26
GN 743-32-M40x1.5-B	12	M40x1.5	50	12	8.5	46	39
GN 743-32-M42x1.5-B	32	M42x1.5	50	12	9	46	43
GN 743-7-G1/4-B	7	G1/4	20	7.5	6.5	18	6
GN 743-11-G3/8-B	11	G 3/8	22	8	7.5	20	9
GN 743-14-G1/2-B	14	G 1/2	26	8.5	7.5	23	11
GN 743-18-G3/4-B	18	G 3/4	32	9	8	30	18
GN 743-24-G1-B	24	G 1	40	11	8.5	36	26
GN 743-32-G1¼-B	32	G 1¼	50	12	9	46	42
GN 743-32-G1½-B	32	G1½	60	13	9	55	45

GN 743.1

Oil level indicators for high temperatures

RoHS +180°C -20°C

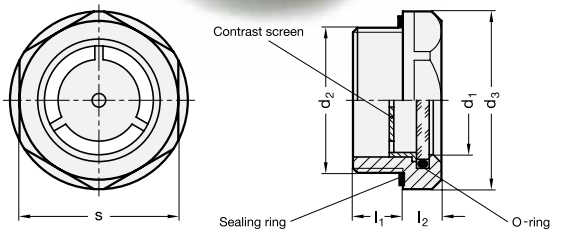
- **Material**
  Aluminium, fine turned finish.
  - Version **A**: with technopolymer (Polysulfon) contrast screen.
  - Version **B**: without contrast screen.
- **Window**
  ESG-glass.
- **Flat packing ring**
  FPM (type VITON®, registered trade mark of DuPont Dow Elastomers). Identification by not black finish.
- **Maximum continuous working temperature**
  180°C.

Accessories on request

Brass nut type GH. (see page 77) for fitting to reservoirs with wall thickness smaller than 5 mm.

Features and applications

GN 743.1 oil level indicators can be used on pressurised oil tanks (oil-proof resistance data available on request). The natural glass window is resistant to scratches. The seal between the aluminium body and the glass window is guaranteed by an O-ring in FKM (type VITON®, registered trade mark of DuPont Dow Elastomers). Identification by not black finish.



Standard Elements	Main dimensions						⚖
Description	d1	d2	d3	l1	l2	s	g
GN 743.1-7-M14x1.5-A	7	M14x1.5	20	7.5	6.5	18	6
GN 743.1-11-M16x1.5-A	11	M16x1.5	22	8	7.5	20	8
GN 743.1-14-M20x1.5-A	14	M20x1.5	26	8.5	7.5	23	10
GN 743.1-18-M26x1.5-A	18	M26x1.5	32	9	8	30	18
GN 743.1-18-M27x1.5-A	18	M27x1.5	32	9	8	30	18
GN 743.1-24-M33x1.5-A	24	M33x1.5	40	11	8.5	36	26
GN 743.1-32-M40x1.5-A	32	M40x1.5	50	12	9	46	39
GN 743.1-32-M42x1.5-A	32	M42x1.5	50	12	9	46	43
GN 743.1-7-G1/4-A	7	G1/4	20	7.5	6.5	18	6
GN 743.1-11-G3/8-A	11	G 3/8	22	8	7.5	20	9
GN 743.1-14-G1/2-A	14	G 1/2	26	8.5	7.5	23	11
GN 743.1-18-G3/4-A	18	G 3/4	32	9	8	30	18
GN 743.1-24-G1-A	24	G 1	40	11	8.5	36	26
GN 743.1-32-G1¼-A	32	G 1¼	50	12	9	46	42
GN 743.1-32-G1½-A	32	G 1½	60	13	9	55	45
GN 743.1-7-M14x1.5-B	7	M14x1.5	20	7.5	6.5	18	6
GN 743.1-11-M16x1.5-B	8	M16x1.5	22	8	7.5	20	8
GN 743.1-14-M20x1.5-B	14	M20x1.5	26	8.5	7.5	23	10
GN 743.1-18-M26x1.5-B	18	M26x1.5	32	9	8	30	18
GN 743.1-18-M27x1.5-B	18	M27x1.5	32	9	8	30	18
GN 743.1-24-M33x1.5-B	24	M33x1.5	40	11	8.5	36	26
GN 743.1-32-M40x1.5-B	32	M40x1.5	50	12	8.5	46	39
GN 743.1-32-M42x1.5-B	32	M42x1.5	50	12	9	46	43
GN 743.1-7-G1/4-B	7	G1/4	20	7.5	6.5	18	6
GN 743.1-11-G3/8-B	11	G 3/8	22	8	7.5	20	9
GN 743.1-14-G1/2-B	14	G 1/2	26	8.5	7.5	23	11
GN 743.1-18-G3/4-B	18	G 3/4	32	9	8	30	18
GN 743.1-24-G1-B	24	G 1	40	11	8.5	36	26
GN 743.1-32-G1¼-B	32	G 1¼	50	12	9	46	42
GN 743.1-32-G1½-B	32	G 1½	60	13	9	55	45

GN 743.2

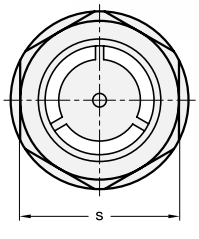
Oil level indicators

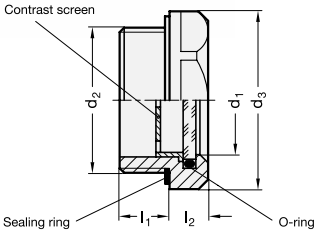
RoHS +100°C -30°C

- **Material**
  Brass.
  - Execution **A**: with technopolymer (Polysulfon) contrast screen.
  - Execution **B**: without contrast screen.
- **Window**
  Float-glass.
- **Packing ring**
  NBR synthetic rubber flat and O-ring.
- **Maximum continuous working temperature**
  100° C.

Features and applications

Oil level indicators GN 743.2 offer the following features: genuine glass of high stability and scratch proof. The sealing is achieved with an O-ring on the periphery and not on the face edge of the glass. Leak tightness is therefore not affected by axial pressures.
The outside diameter of these oil level sight glasses with recessed hexagon is chosen to match mounting holes for tube fittings according to DIN 3852.
The seal is housed in a groove and it can therefore not be lost. In addition, this groove prevents the seal from being extruded when the sight glass is tightened. The location of this seal allows also the use of a softer Elastomer which guarantees better and easier sealing.
Oil level indicators GN 743.2 can be used on pressurised oil tanks. Tests regarding maximum pressure are available on request.
Also, these oil level sight glasses are suitable for applications with subpressure.





Standard Elements	Main dimensions						⚖
Description	d1	d2	d3	l1	l2	s	g
GN 743.2-11-M16x1.5-A	11	M16x1.5	22	8	7.5	20	19
GN 743.2-14-M20x1.5-A	14	M20x1.5	26	8.5	7.5	23	23
GN 743.2-18-M26x1.5-A	18	M26x1.5	32	9	8	30	44
GN 743.2-18-M27x1.5-A	18	M27x1.5	32	9	8	30	46
GN 743.2-24-M33x1.5-A	24	M33x1.5	40	11	8.5	36	70
GN 743.2-11-G3/8-A	11	G 3/8	22	8	7.5	20	20
GN 743.2-14-G1/2-A	14	G 1/2	26	8.5	7.5	23	23
GN 743.2-18-G3/4-A	18	G 3/4	32	9	8	30	44
GN 743.2-24-G1-A	24	G 1	40	11	8.5	36	69
GN 743.2-11-M16x1.5-B	11	M16x1.5	22	8	7.5	20	19
GN 743.2-14-M20x1.5-B	14	M20x1.5	26	8.5	7.5	23	23
GN 743.2-18-M26x1.5-B	18	M26x1.5	32	9	8	30	44
GN 743.2-18-M27x1.5-B	18	M27x1.5	32	9	8	30	46
GN 743.2-24-M33x1.5-B	24	M33x1.5	40	11	8.5	36	70
GN 743.2-11-G3/8-B	11	G 3/8	22	8	7.5	20	20
GN 743.2-14-G1/2-B	14	G 1/2	26	8.5	7.5	23	23
GN 743.2-18-G3/4-B	18	G 3/4	32	9	8	30	44
GN 743.2-24-G1-B	24	G 1	40	11	8.5	36	69

GN 743.3

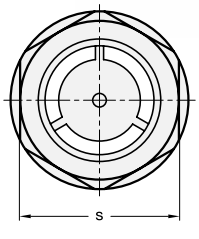
Oil level indicators for high temperatures

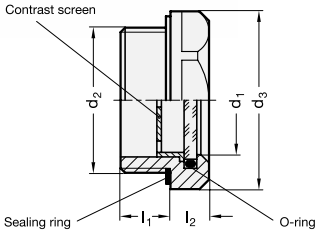
RoHS +180°C -20°C

- **Material**
  Brass.
  - Execution **A**: with technopolymer (Polysulfon) contrast screen.
  - Execution **B**: without contrast screen.
- **Window**
  ESG-glass.
- **Packing rings**
  FPM (type VITON®, registered trade mark of DuPont Dow Elastomers) synthetic rubber and O-ring.
- **Maximum continuous working temperature**
  180°.

Features and applications

Oil level indicators GN 743.3 offer the following features: genuine glass of high stability and scratch proof. The sealing is achieved with an O-ring on the periphery and not on the face edge of the glass. Leak tightness is therefore not affected by axial pressures. The outside diameter of these oil level sight glasses with recessed hexagon is chosen to match mounting holes for tube fittings according to DIN 3852. The seal is housed in a groove and it can therefore not be lost. In addition, this groove prevents the seal from being extruded when the sight glass is tightened. The location of this seal allows also the use of a softer Elastomer which guarantees better and easier sealing.
Oil level indicators GN 743.3 can be used on pressurised oil tanks. Tests regarding maximum pressure are available on request.
Also, these oil level sight glasses are suitable for applications with subpressure.





Standard Elements	Main dimensions						⚖
Description	d1	d2	d	l1	l2	s	g
GN 743.3-11-M16x1.5-A	11	M16x1.5	22	8	7.5	20	19
GN 743.3-14-M20x1.5-A	14	M20x1.5	26	8.5	7.5	23	23
GN 743.3-18-M26x1.5-A	18	M26x1.5	32	9	8	30	44
GN 743.3-18-M27x1.5-A	18	M27x1.5	32	9	8	30	46
GN 743.3-24-M33x1.5-A	24	M33x1.5	40	11	8.5	36	70
GN 743.3-11-G3/8-A	11	G 3/8	22	8	7.5	20	20
GN 743.3-14-G1/2-A	14	G 1/2	26	8.5	7.5	23	23
GN 743.3-18-G3/4-A	18	G 3/4	32	9	8	30	44
GN 743.3-24-G1-A	24	G 1	40	11	8.5	36	69
GN 743.3-11-M16x1.5-B	11	M16x1.5	22	8	7.5	20	19
GN 743.3-14-M20x1.5-B	14	M20x1.5	26	8.5	7.5	23	23
GN 743.3-18-M26x1.5-B	18	M26x1.5	32	9	8	30	44
GN 743.3-18-M27x1.5-B	18	M27x1.5	32	9	8	30	46
GN 743.3-24-M33x1.5-B	24	M33x1.5	40	11	8.5	36	70
GN 743.3-11-G3/8-B	11	G 3/8	22	8	7.5	20	20
GN 743.3-14-G1/2-B	14	G 1/2	26	8.5	7.5	23	23
GN 743.3-18-G3/4-B	18	G 3/4	32	9	8	30	44
GN 743.3-24-G1-B	24	G 1	40	11	8.5	36	69

GN 743.4

INOX Stainless Steel

Oil level indicators

RoHS +100°C -20°C

- **Material**
  AISI 303 stainless steel.
- **Cirplip**
  AISI 301 stainless steel.
- **Window**
  Float-glass.
- **Packing ring**
  NBR synthetic rubber flat and O-ring.
- **Maximum continuous working temperature**
  100°C.

Features and applications

Oil level indicators GN 743.4 offer the following features:
genuine glass of high stability and scratch proof. The sealing is achieved with an O-ring on the periphery and not on the face edge of the glass. Leak tightness is therefore not affected by axial pressures. The outside diameter of these oil level sight glasses with recessed hexagon is chosen to match mounting holes for tobe connections according to DIN 3852. The seal is housed in a groove and it can therefore not be lost. In addition, this groove prevents the seal from being extruded when the sight glass is tightened. The location of this seal allows also the use of a softer Elastomer which guarantees better and easier sealing.
Oil level indicators GN 743.4 can be used on pressurised oil tanks. Tests regarding maximum pressure are available on request.
Also, these oil level sight glasses are suitable for applications with subpressure.

Standard Elements	Main dimensions						⚖
Description	d1	d2	d3	l1	l2	s	g
GN 743.4-11-M16x1.5-A	11	M16x1.5	22	8	7.5	20	19
GN 743.4-14-M20x1.5-A	14	M20x1.5	26	8.5	7.5	23	23
GN 743.4-18-M26x1.5-A	18	M26x1.5	32	9	8	30	41
GN 743.4-24-M33x1.5-A	24	M33x1.5	40	11	8.5	36	64
GN 743.4-32-M42x1.5-A	32	M42x1.5	50	12	9	46	102
GN 743.4-11-G3/8-A	11	G3/8	22	8	7.5	20	19
GN 743.4-14-G1/2-A	14	G1/2	26	8.5	7.5	23	23
GN 743.4-18-G3/4-A	18	G3/4	32	9	8	30	41
GN 743.4-24-G1-A	24	G1	40	11	8.5	36	64
GN 743.4-32-G1¼-A	32	G1 1/4	50	12	9	46	102
GN 743.4-11-M16x1.5-B	11	M16x1.5	22	8	7.5	20	19
GN 743.4-14-M20x1.5-B	14	M20x1.5	26	8.5	7.5	23	23
GN 743.4-18-M26x1.5-B	18	M26x1.5	32	9	8	30	41
GN 743.4-24-M33x1.5-B	24	M33x1.5	40	11	8.5	36	64
GN 743.4-32-M42x1.5-B	32	M42x1.5	50	12	9	46	102
GN 743.4-11-G3/8-B	11	G 3/8	22	8	7.5	20	19
GN 743.4-14-G1/2-B	14	G 1/2	26	8.5	7.5	23	23
GN 743.4-18-G3/4-B	18	G 3/4	32	9	8	30	41
GN 743.4-24-G1-B	24	G 1	40	11	8.5	36	64
GN 743.4-32-G1¼-B	32	G 1¼	50	12	9	46	102

GN 743.5

INOX Stainless Steel

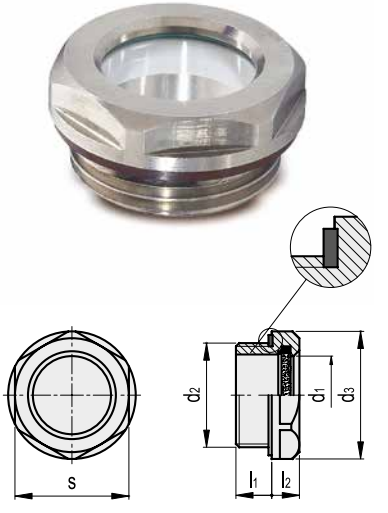
Oil level indicators

RoHS +180°C -20°C

- **Material**
  AISI 303 stainless steel.
- **Standard Versions available**
  - Type **A**: with contrast Screen
  - Type **B**: without contrast screen
- **Window**
  ESG-glass.
- **Packing ring**
  FPM (type VITON®, registered trade mark of DuPont Dow Elastomers) synthetic rubber flat and O-ring.
- **Maximum continuous working temperature**
  180°C.

Features and applications

Oil level indicators GN 743.5 offer the following features:
genuine glass of high stability and scratch proof. The sealing is achieved with an O-ring on the periphery and not on the face edge of the glass. Leak tightness is therefore not affected by axial pressures. The outside diameter of these oil level sight glasses with recessed hexagon is chosen to match mounting holes for tobe connections according to DIN 3852. The seal is housed in a groove and it can therefore not be lost. In addition, this groove prevents the seal from being extruded when the sight glass is tightened. The location of this seal allows also the use of a softer Elastomer which guarantees better and easier sealing.
Oil level indicators GN 743.5 can be used on pressurised oil tanks. Tests regarding maximum pressure are available on request.
Also, these oil level sight glasses are suitable for applications with subpressure.



Standard Elements	Main dimensions						⚖
Description	d1	d2	d3	l1	l2	s	g
GN 743.5-11-M16x1.5-A	11	M16x1.5	22	8	7.5	20	19
GN 743.5-14-M20x1.5-A	14	M20x1.5	26	8.5	7.5	23	23
GN 743.5-18-M26x1.5-A	18	M26x1.5	32	9	8	30	41
GN 743.5-24-M33x1.5-A	24	M33x1.5	40	11	8.5	36	64
GN 743.5-32-M42x1.5-A	32	M42x1.5	50	12	9	46	102
GN 743.5-11-G3/8-A	11	G3/8	22	8	7.5	20	19
GN 743.5-14-G1/2-A	14	G1/2	26	8.5	7.5	23	41
GN 743.5-18-G3/4-A	18	G3/4	32	9	8	30	41
GN 743.5-24-G1-A	24	G1	40	11	8.5	36	64
GN 743.5-32-G1¼-A	32	G1 1/4	50	12	9	46	102
GN 743.5-11-M16x1.5-B	11	M16x1.5	8	7.5	22	20	19
GN 743.5-14-M20x1.5-B	14	M20x1.5	8.5	7.5	26	23	23
GN 743.5-18-M26x1.5-B	18	M26x1.5	9	8	32	30	41
GN 743.5-24-M33x1.5-B	24	M33x1.5	11	8.5	40	36	64
GN 743.5-32-M42x1.5-B	32	M42x1.5	12	9	50	46	102
GN 743.5-11-G3/8-B	11	G 3/8	8	7.5	22	20	19
GN 743.5-14-G1/2-B	14	G 1/2	8.5	7.5	26	23	23
GN 743.5-18-G3/4-B	18	G 3/4	9	8	32	30	41
GN 743.5-24-G1-B	24	G 1	11	8.5	40	36	64
GN 743.5-32-G1¼-B	32	G 1¼	12	9	50	46	102

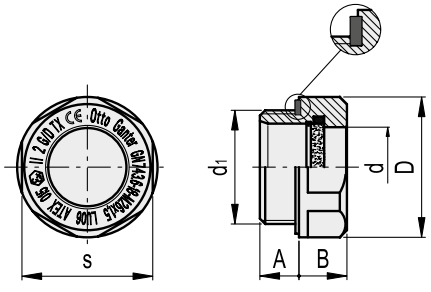
GN 743.6

Oil level indicators

- **Material**
  Aluminium, glossy finish.
- **Window**
  ESG glass.
- **Flat packing ring**
  FPM (type VITON®, registered trade mark of DuPont Dow Elastomers).
- **Maximum continuous working temperature**
  150°C.

Features and applications

The European guidelines for explosion protection introduced on 1st July 2003 (ATEX) also cover the explosion protection in the mechanical sector.
Oil level sight glasses GN 743.6 are suitable for use in an explosion risk environment and they comply with the guidelines 94/9/EG.
Detailed documentation is available and forms part of an order for this product.
GN 743.6 oil level indicators can be used on pressurised oil tanks (oil-proof resistance data available on request). The seal between the aluminium body and the glass window is guaranteed by an O-ring in FKM (type VITON®, registered trade mark of DuPont Dow Elastomers).



Standard Elements	Main dimensions						⚖
Description	d	d1	A	B	D	s	g
GN 743.6-11-M16x1.5	11	M16x1.5	8	8	22	20	8
GN 743.6-14-M20x1.5	14	M20x1.5	8.5	9	26	23	10
GN 743.6-18-M26x1.5	18	M26x1.5	9	11	32	30	21
GN 743.6-18-M27x1.5	18	M27x1.5	9	11	32	30	22
GN 743.6-18-M27x2	18	M27x2	9	11	32	30	22
GN 743.6-11-G3/8	11	G 3/8	8	8	22	20	8
GN 743.6-14-G1/2	14	G 1/2	8.5	9	26	23	11
GN 743.6-18-G3/4	18	G 3/4	9	11	32	30	21

GN 743.7

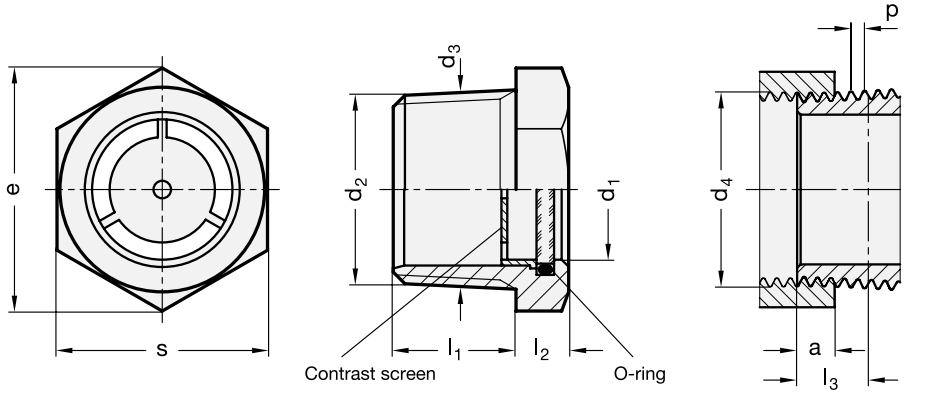
Oil level indicators with conical threading

RoHS +100°C -20°C

- **Material**
  Brass.
  - Version **A**: with technopolymer (Polysulfon) contrast screen.
  - Version **B**: without contrast screen.
- **Window**
  Float-glass.
- **O-ring**
  NBR synthetic rubber.
- **Maximum continuous working temperature**
  100°C.

Features and applications

The conical thread of the oil level indicators GN 743.7 makes a metallic seal possible. When tightening the conical male thread R it blocks itself with the appropriate cylindrical female thread Rp.
At the reference level the R-male thread has the same thread diameter as the Rp-female thread, so that it can be screwed in by hand. The strong tightening by means of a tool increases the length of engagement and seals the screw connection. Additionally a sealant (hemp or teflon band) is usually used. The R-thread is "roughened", so that the sealant does not shift when screwing in.
Oil level indicators GN 743.7 can be used on pressurised tanks. Data of pressure and vacuum pressure tests is available.



Standard Elements	Main dimensions											⚖
Description	d1	d2	a *	d3 at a	d4	e	l1	l2	l3 **	s	p ***	g
GN 743.7-11-R3/8-A	11	R 3/8	6.4	16.7	Rp 3/8	22	13	6	10.1	19	1.34	19
GN 743.7-14-R1/2-A	14	R 1/2	8.2	21	Rp 1/2	27.5	17	7	13.2	24	1.81	33
GN 743.7-18-R3/4-A	18	R 3/4	9.5	26.4	Rp 3/4	31	18	8	14.5	27	1.81	50
GN 743.7-24-R1-A	24	R 1	10.4	33.2	Rp 1	40.5	21	9	16.8	35	2.30	93
GN 743.7-32-R1¼-A	32	R 1¼	12.7	42	Rp 1¼	53	24	9	19.1	44.5	2.30	149
GN 743.7-11-R3/8-B	11	R 3/8	6.4	16.7	Rp 3/8	22	13	6	10.1	19	1.34	19
GN 743.7-14-R1/2-B	14	R 1/2	8.2	21	Rp 1/2	27.5	17	7	13.2	24	1.81	33
GN 743.7-18-R3/4-B	18	R 3/4	9.5	26.4	Rp 3/4	31	18	8	14.5	27	1.81	50
GN 743.7-24-R1-B	24	R 1	10.4	33.2	Rp 1	40.5	21	9	16.8	35	2.30	93
GN 743.7-32-R1¼-B	32	R 1¼	12.7	42	Rp 1¼	53	24	9	19.1	44.5	2.30	149
GN 743.7-11-3/8 NPT-A	11	3/8 NPT	6.4	17.1	3/8 NPT	22	15	6	-	19.1	1.41	19
GN 743.7-14-1/2 NPT-A	14	1/2 NPT	8.2	21.2	1/2 NPT	27.5	16	7	-	23.8	1.81	33
GN 743.7-18-3/4 NPT-A	18	3/4 NPT	9.5	26.6	3/4 NPT	33	18	8	-	28.6	1.81	50
GN 743.7-24-1 NPT-A	24	1 NPT	10.4	33.7	1 NPT	41.5	21	9	-	34.9	2.21	93
GN 743.7-32-1¼NPT-A	32	1¼ NPT	12.7	42.2	1 NPT¼	51.5	23	9	-	44.5	2.21	149
GN 743.7-11-3/8 NPT-B	11	3/8 NPT	6.4	17.1	3/8 NPT	22	15	6	-	19.1	1.41	19
GN 743.7-14-1/2 NPT-B	14	1/2 NPT	8.2	21.2	1/2 NPT	27.5	16	7	-	23.8	1.81	33
GN 743.7-18-3/4 NPT-B	18	3/4 NPT	9.5	26.6	3/4 NPT	33	18	8	-	28.6	1.81	50
GN 743.7-24-1 NPT-B	24	1 NPT	10.4	33.7	1 NPT	41.5	21	9	-	34.9	2.21	93
GN 743.7-32-1¼NPT-B	32	1¼ NPT	12.7	42.2	1¼ NPT	51.5	23	9	-	44.5	2.21	149

* datum plane ** usable thread length *** thread pitch

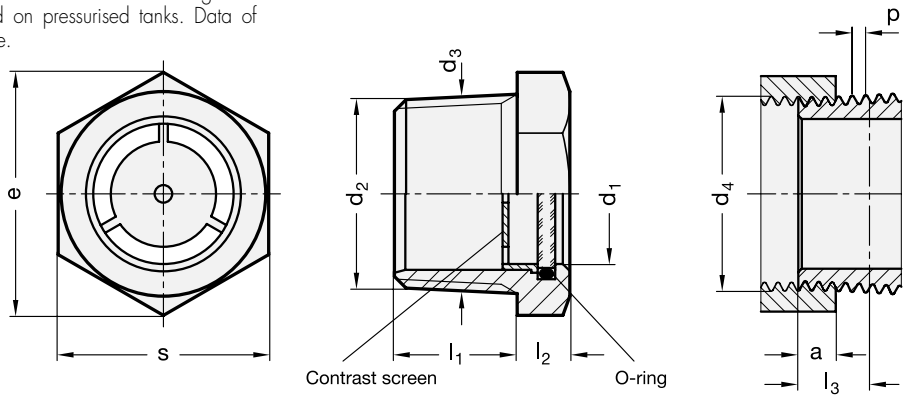
GN 743.8

Oil level indicators with conical threading for high temperatures

- **Material**
  Brass.
  - Version **A**: with technopolymer (Polysulfon) contrast screen.
  - Version **B**: without contrast screen.
- **Window**
  ESG-glass.
- **O-ring**
  FPM synthetic rubber (type VITON®, registered trade mark of DuPont Dow Elastomers).
- **Maximum continuous working temperature**
  180°C.

Features and applications

The conical thread of the oil level indicators GN 743.8 makes a metallic seal possible. When tightening the conical male thread R it blocks itself with the appropriate cylindrical female thread Rp.
At the reference level the R-male thread has the same thread diameter as the Rp-female thread, so that it can be screwed in by hand. The strong tightening by means of a tool increases the length of engagement and seals the screw connection. Additionally a sealant (hemp or teflon band) is usually used. The R-thread is "roughened", so that the sealant does not shift when screwing in.
Oil level indicators GN 743.8 can be used on pressurised tanks. Data of pressure and vacuum pressure tests is available.



Standard Elements	Main dimensions											⚖
Description	d1	d2	a *	d3 at a	d4	e	l1	l2	l3 **	s	p ***	g
GN 743.8-11-R3/8-A	11	R 3/8	6.4	16.7	Rp 3/8	22	13	6	10.1	19	1.34	19
GN 743.8-14-R1/2-A	14	R 1/2	8.2	21	Rp 1/2	27.5	17	7	13.2	24	1.81	33
GN 743.8-18-R3/4-A	18	R 3/4	9.5	26.4	Rp 3/4	31	18	8	14.5	27	1.81	50
GN 743.8-24-R1-A	24	R 1	10.4	33.2	Rp 1	40.5	21	9	16.8	35	2.30	93
GN 743.8-32-R1¼-A	32	R 1¼	12.7	42	Rp 1¼	53	24	9	19.1	44.5	2.30	149
GN 743.8-11-R3/8-B	11	R 3/8	6.4	16.7	Rp 3/8	22	13	6	10.1	19	1.34	19
GN 743.8-14-R1/2-B	14	R 1/2	8.2	21	R 1/2	27.5	17	7	13.2	24	1.81	33
GN 743.8-18-R3/4-B	18	R 3/4	9.5	26.4	Rp 3/4	31	18	8	14.5	27	1.81	50
GN 743.8-24-R1-B	24	R 1	10.4	33.2	Rp 1	40.5	21	9	16.8	35	2.30	93
GN 743.8-32-R1¼-B	32	R 1¼	12.7	42	Rp 1¼	53	24	9	19.1	44.5	2.30	149
GN 743.8-11-3/8 NPT-A	11	3/8 NPT	6.4	17.1	3/8 NPT	22	15	6	-	19.1	1.41	19
GN 743.8-14-1/2 NPT-A	14	1/2 NPT	8.2	21.2	1/2 NPT	27.5	16	7	-	23.8	1.81	33
GN 743.8-18-3/4 NPT-A	18	3/4 NPT	9.5	26.6	3/4 NPT	33	18	8	-	28.6	1.81	50
GN 743.8-24-1 NPT-A	24	1 NPT	10.4	33.7	1 NPT	41.5	21	9	-	34.9	2.21	93
GN 743.8-32-1¼ NPT-A	32	1¼ NPT	12.7	42.2	1¼ NPT	51.5	23	9	-	44.5	2.21	149
GN 743.8-11-3/8 NPT-B	11	3/8 NPT	6.4	17.1	3/8 NPT	22	15	6	-	19.1	1.41	19
GN 743.8-14-1/2 NPT-B	14	1/2 NPT	8.2	21.2	1/2 NPT	27.5	16	7	-	23.8	1.81	33
GN 743.8-18-3/4 NPT-B	18	3/4 NPT	9.5	26.6	3/4 NPT	33	18	8	-	28.6	1.81	50
GN 743.8-24-1 NPT-B	24	3/4 NPT	10.4	33.7	3/4 NPT	41.5	21	9	-	34.9	2.21	93
GN 743.8-32-1¼ NPT-B	32	1¼ NPT	12.7	42.2	1¼ NPT	51.5	23	9	-	44.5	2.21	149

*datum plane ** usable thread length *** thread pitch

GN 744

Oil level indicators with prismatic window

RoHS +110°C -30°C

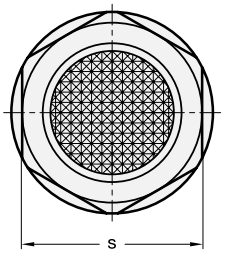
- **Material**
  Aluminium, fine turned finish.
- **Prismatic window**
  Transparent polyamide based (PA-T/AR) technopolymer. Resistant to alcohol, solvents, oils with additives, greases, acids and alkali. The window consists of a continuous series of prisms, which provide a clear and immediate reading of the level of the oil contained in the reservoir.
- **Flat packing ring**
  NBR synthetic rubber.
- **Maximum continuous working temperature**
  110°C.

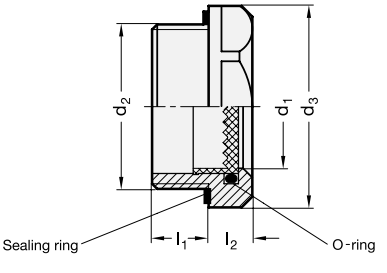
Accessories on request

Brass nut type GH. (see page 77) for fitting to reservoirs with wall thickness smaller than 5 mm.

Features and applications

GN 744 oil level indicators can be used on pressurised oil tanks (oil-proof resistance data available on request).
The seal between the aluminium body and the technopolymer prismatic window is guaranteed by a packing ring in NBR synthetic rubber.





Standard Elements	Main dimensions						⚖
Description	d1	A	B	D	d	s	g
GN 744-14-M20x1.5	M20x1.5	8.5	7.5	26	14	23	5
GN 744-18-M26x1.5	M26x1.5	9	8	32	18	30	15
GN 744-18-M27x1.5	M27x1.5	9	8	32	18	30	16
GN 744-24-M33x1.5	M33x1.5	11	8.5	40	24	36	22

GN 7403

INOX Stainless Steel

Breather strainers

RoHS

- **Specification**
  Body: Aluminium AL or Stainless Steel AISI 303 NI.
  Strainer: Stainless Steel mesh, AISI 304.
  Strainer bezel: plastic (Polyamide PA) glass fibre reinforced, temperature resistant up to 100°C.
  Sealing / O-Ring: NBR (Perbunan).

Information

Breather strainers GN 7403 are used in enclosure and device construction. Inserted into the wall of the enclosure, they ensure pressure equilibrium between the inside of the enclosure and the outside. Any dirt and dust particles carried by the medium (usually gas) are prevented from exiting depending on the mesh size. This protects the insides of sensitive devices and machinery parts from dirt and pollution and also protects the environment from any exiting dust. The outside diameter of the enclosure with the recessed hexagon matches the bolt mounting holes for DIN 3852 threaded pipe connectors. The sealing ring is embedded in a radial and plane-sided recess which makes the seal captive and prevents it from being squeezed out during tightening.

Assembly instruction:

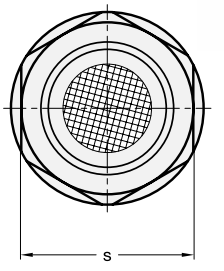
For mounting on walls of less than 4 mm thickness, please use mounting nut GN 543.1.

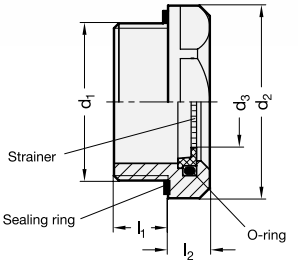
Accessory

Mounting nut GN 543.1

On request

- Body in brass
- Other mesh size
- Other material for the strainer





Standard Elements	Main dimensions						
Description	d1	d2	d3	l1	l2	s	Mesh size in µm
GN 7403-AL-G1/2-100	G 1/2	26	10	8.5	7.5	23	100
GN 7403-AL-G1/2-500	G 1/2	26	10	8.5	7.5	23	500
GN 7403-AL-G3/4-100	G 3/4	32	14	9	8	30	100
GN 7403-AL-G3/4-500	G 3/4	2	14	9	8	30	500
GN 7403-AL-G1-100	G 1	40	20	11	8.5	36	100
GN 7403-AL-G1-500	G 1	40	20	11	8.5	36	500
GN 7403-AL-M20x1.5-100	M20x1.5	26	10	8.5	7.5	23	100
GN 7403-AL-M20x1.5-500	M20x1.5	26	10	8.5	7.5	23	500
GN 7403-AL-M26x1.5-100	M26x1.5	32	14	9	8	30	100
GN 7403-AL-M26x1.5-500	M26x1.5	32	14	9	8	30	500
GN 7403-AL-M33x1.5-100	M33x1.5	40	20	11	8.5	36	100
GN 7403-AL-M33x1.5-500	M33x1.5	40	20	11	8.5	36	500
GN 7403-NI-G1/2-100	G1/2	26	10	8.5	7.5	23	100
GN 7403-NI-G1/2-500	G1/2	26	10	8.5	7.5	23	500
GN 7403-NI-G3/4-100	G3/4	30	14	9	8	30	100
GN 7403-NI-G3/4-500	G3/4	32	14	9	8	30	500
GN 7403-NI-G1-100	G1	40	20	11	8.5	36	100
GN 7403-NI-G1-500	G1	40	20	11	8.5	36	500
GN 7403-NI-M20x1.5-100	M20x1.5	26	10	8.5	7.5	23	100
GN 7403-NI-M20x1.5-500	M20x1.5	26	10	8.5	7.5	23	500
GN 7403-NI-M26x1.5-100	M26x1.5	32	14	9	8	30	100
GN 7403-NI-M26x1.5-500	M26x1.5	32	14	9	8	30	500
GN 7403-NI-M33x1.5-100	M33x1.5	40	20	11	8.5	36	100
GN 7403-NI-M33x1.5-500	M33x1.5	40	20	11	8.5	36	500

HGFT-PR

ELESA Original design

Oil level indicators with prismatic window

RoHS PA PA-T AR +100°C -30°C

- **Material**
  Polyamide based (PA) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
- **Colour**
  Black, glossy finish.
- **Prismatic window**
  Transparent polyamide based (PA-T/AR) technopolymer. Resistant to alcohol, solvents, oils with additives, greases, acids and alkali. The window consists of a continuous series of prisms which provide a clear and immediate reading of the level of the oil contained in the reservoir.
- **Flat packing ring**
  NBR synthetic rubber.
- **Maximum continuous working temperature**
  100°C at 3 bar pressure.

Accessories on request

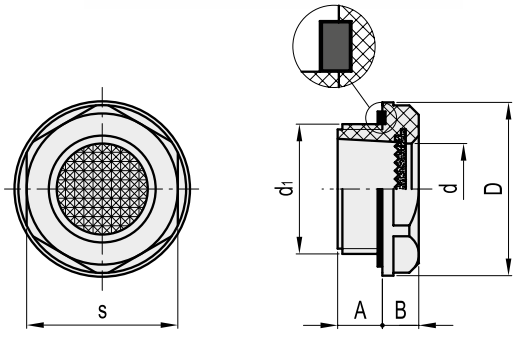
Brass nut type GH. (see page 77) for fitting to reservoirs with wall thickness smaller than 5 mm.

Technical data

An adequate tightening torque (see table below) is recommended when screwing the oil level indicator, so as to guarantee optimal tightness without any deformation of the packing ring. Suggested tightening torque is the result of laboratory tests at ambient temperature (23°C) with indicator, packing ring and reservoir walls perfectly cleaned.

Note

For use with fluids containing special additives, please contact ELESA Sales Department.



Standard Elements		Main dimensions						Tightening torque	
Code	Description	d1	A	B	D	d	s	[Nm]	g
14462	HGFT.13/PR-1/2-C9	G 1/2	10	8.5	28	14.5	24	6÷8	5
14482	HGFT.16/PR-3/4-C9	G 3/4	9.5	8.5	35	18	32	8÷10	9
14522	HGFT.21/PR-1-C9	G 1	11	9.5	42.5	23	38	10÷12	14
14542	HGFT.25/PR-1¼-C9	G 1¼	11	9	50	30	46	12÷15	30

HGFT-HT-PR

ELESA Original design

Oil level indicators with prismatic window for high temperatures

RoHS PA +140°C -30°C

- **Material**
  Polyamide based (PA) technopolymer. Resistant to alcohol (methanol), solvents, oils with additives, greases, hydrocarbons and other chemical agents.
- **Colour**
  Black, glossy finish.
- **Prismatic window**
  Transparent sulphonic based technopolymer. Resistant to alcohol (methanol), solvents, oils with additives, greases, hydrocarbons, acids and alkali. The window consists of a continuous series of prisms which provide a clear and immediate reading of the level of the oil contained in the reservoir.
- **Flat packing ring**
  FKM (type VITON®, registered trade mark of DuPont Dow Elastomers).
- **Maximum continuous working temperature**
  140°C at 7 bar pressure.

Accessories on request

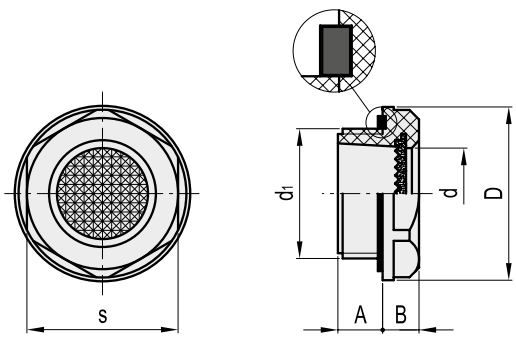
Brass nut type GH. (see page 77) for fitting to reservoirs with wall thickness smaller than 5 mm.

Technical data

An adequate tightening torque (see table below) is recommended when screwing the oil level indicator, so as to guarantee optimal tightness without any deformation of the packing ring. Suggested tightening torque is the result of laboratory tests at ambient temperature (23°C) with indicator, packing ring and reservoir walls perfectly cleaned.

Note

For use with fluids containing special additives, please contact ELESA Sales Department.



Standard Elements		Main dimensions						Tightening torque	
Code	Description	d1	A	B	D	d	s	[Nm]	g
14463	HGFT.13/HT-PR-1/2	G 1/2	10	8.5	28	14.5	24	6÷8	5
14483	HGFT.16/HT-PR-3/4	G 3/4	9.5	8.5	35	18	32	8÷10	9
14523	HGFT.21/HT-PR-1	G 1	11	9.5	42.5	23	38	10÷12	14

HFTX.

ELESA Original design

Oil level indicators

RoHS PA-T +100°C -30°C

- **Threaded body with magnifying lens**
  Transparent polyamide based (PA-T) technopolymer. Resistant to solvents, oils with additives, greases, acids and alkali. Avoid contact with alcohol or detergents containing alcohol.
- **Star-shaped contrast screen**
  Matte anodised aluminium with red central level point.
- **Flat packing ring**
  NBR synthetic rubber.
- **Maximum continuous working temperature**
  100°C.

Accessories on request

Brass nut type GH. (see page 77) for fitting to reservoirs with wall thickness smaller than 5 mm.

Features

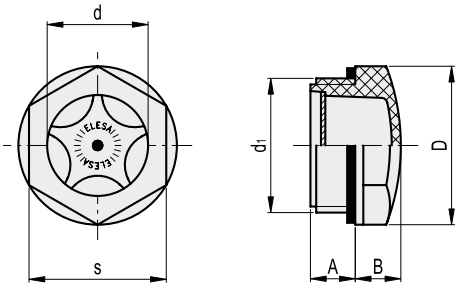
The particular shape of the magnifying lens increases and improves visibility even from side positions.

Technical data

An adequate tightening torque (see table below) is recommended when screwing the oil level indicator, so as to guarantee optimal tightness without any deformation of the packing ring. Suggested tightening torque is the result of laboratory tests at ambient temperature (23°C) with indicator, packing ring and reservoir walls perfectly cleaned.

Note

For use with fluids containing special additives, please contact ELESA Sales Department.



Standard Elements		Main dimensions						Tightening torque	⚖
Code	Description	d1	A	B	D	d	s	[Nm]	g
13661	HFTX.11-M16x1.5	M16x1.5	8	7	22	11	19	2÷3	4
13681	HFTX.14-M20x1.5	M20x1.5	9.5	8	26	14	22	8÷10	5
13701	HFTX.18-M25x1.5	M25x1.5	8	9	31.5	18	27	8÷10	8
13726	HFTX.21-M26x1.5	M26x1.5	13	9	31.5	18	27	8÷10	8
13711	HFTX.19-M27x1.5	M27x1.5	9	9	31.5	20	27	8÷10	8
13731	HFTX.22-M30x1.5	M30x1.5	9	10	35	22	30	8÷10	10
13751	HFTX.26-M35x1.5	M35x1.5	11	10	40	25	34	8÷10	13
13771	HFTX.31-M40x1.5	M40x1.5	11.5	13	47.5	30	40.5	8÷10	20
13651	HFTX.9-1/4	G 1/4	10	6	18	9	15	2÷3	3
13671	HFTX.12-3/8	G 3/8	7.5	7	22	11	19	3÷5	4
13691	HFTX.15-1/2	G 1/2	10.5	8	26	14	22	4÷6	5
13721	HFTX.20-3/4	G 3/4	10.5	9	31.5	20	27	6÷8	8
13741	HFTX.24-1	G 1	11	10	40	25	34	8÷10	12
13761	HFTX.30-1¼	G 1¼	11.5	13	47.5	30	40.5	8÷10	20

HFTX-PR

ELESA Original design

Oil level indicators with prismatic window

RoHS PA-T +110°C -30°C

- **Threaded body with prismatic window**
  Transparent polyamide based (PA-T) technopolymer. Resistant to solvents, oils with additives, greases, acids and alkali. Avoid contact with alcohol or detergents containing alcohol.
  The window consist of a continuous series of prisms which provide a clear and immediate reading of the level of the oil contained in the reservoir.
- **Flat packing ring**
  NBR synthetic rubber.
- **Maximum continuous working temperature**
  110°C.

Accessories on request

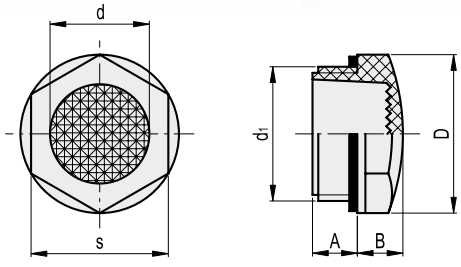
Brass nut type GH. (see page 77) for fitting to reservoirs with wall thickness smaller than 5 mm.

Technical data

An adequate tightening torque (see table below) is recommended when screwing the oil level indicator, so as to guarantee optimal tightness without any deformation of the packing ring. Suggested tightening torque is the result of laboratory tests at ambient temperature (23°C) with indicator, packing ring and reservoir walls perfectly cleaned.

Note

For use with fluids containing special additives, please contact ELESA Sales Department.



Standard Elements		Main dimensions						Tightening torque	⚖⚖
Code	Description	d1	A	B	D	d	s	[Nm]	g
13652	HFTX.9/PR-1/4	G 1/4	10	6	18	9	15	2÷3	3
13672	HFTX.12/PR-3/8	G 3/8	7.5	7	22	11	19	3÷5	4
13692	HFTX.15/PR-1/2	G 1/2	10.5	8	26	14	22	4÷6	5
13722	HFTX.20/PR-3/4	G 3/4	10.5	9	31.5	20	27	6÷8	8
13742	HFTX.24/PR-1	G 1	11	10	40	25	34	8÷10	12

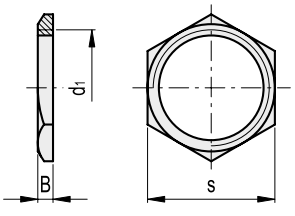
GH.

Nuts

- **Material**
  Brass.

Features and applications

GH. nuts can be used for fitting the following indicators to reservoirs with wall thikness smaller than 5 mm:
- HGFT. (see page 66)
- GN 743 (see page 68)
- GN 743.1 (see page 68)
- HGFT.PR (see page 75)
- HGFT.HT-PR (see page 75)
- GN 744 (see page 74)
- HFTX. (see page 76)
- HFTX.PR (see page 77)
- HCFE. (see page 80)
- HCFE-C (see page 81)



Standard Elements		Main dimensions			⚖⚖
Code	Description	d1	B	s	g
14991	GH. 1/4	G 1/4	6	19	9
15001	GH. 3/8	G 3/8	3	19	3
15011	GH. 1/2	G 1/2	4	26	8
15021	GH. 3/4	G 3/4	5	31	12
15031	GH. 1	G 1	4.5	37	14
15041	GH. 1¼	G 1¼	5	46	23
15051	GH. 2	G 2	6	65	40

HRT.

ELESA Original design

Oil level indicators push-fit

- **Material**
  Polyamide based (PA) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
- **Colour**
  Black, matte finish.
- **Window**
  Transparent polyamide based (PA-T/AR) technopolymer. Resistant to alcohol, solvents, oils with additives, greases, acids and alkali.
- **Contrast screen**
  White lacquered aluminium with red level line.
- **Packing ring**
  NBR synthetic rubber O-Ring.
- **Maximum continuous working temperature**
  100°C.

Features and applications

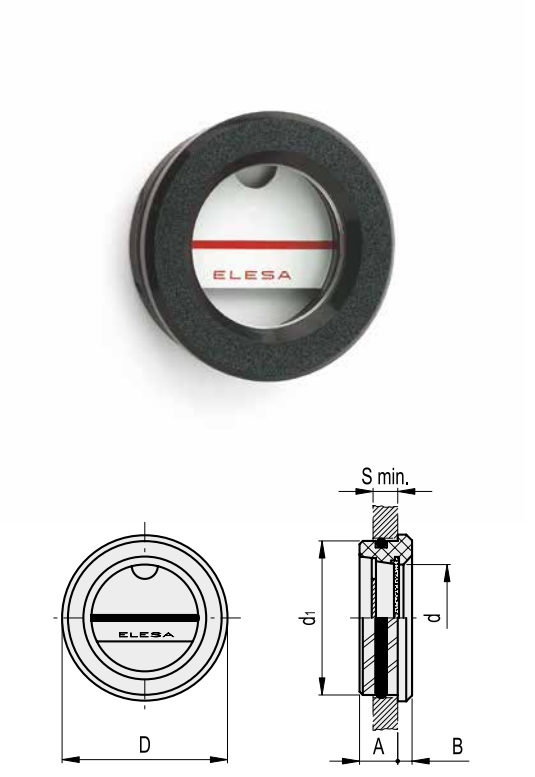
The push-fit assembly is guaranteed by optimized ribbings. Sealing is guaranteed by the O-ring. HRT. oil level indicators push-fit are particularly suitable for assembly on reservoirs with limited pressure.

Assembly instructions

Chamfer hole 1x45° and grease slightly the outside surface of the O-ring to make assembly easier.

Note

For use with fluids containing special additives, please contact ELESA Sales Department.



Standard Elements		Main dimensions						
Code	Description	d1	A	B	D	d	Smin	g
10751	HRT.15-26	26	9	4.5	28	14.5	6	6
10756	HRT.20-32	32	10.5	4.5	36	18	8	10
10761	HRT.25-38	38	11	5	42	23	8	12
10766	HRT.40-60	60	11	5.5	64	40	9	29

HRT-T

ELESA Original design

Oil level indicators push-fit with oil temperature reading

- **Material**
  Polyamide based (PA) technopolymer. Resistant to solvents, oils, greases and other chemical agents.
- **Colour**
  Black, matte finish.
- **Window**
  Transparent polyamide based (PA-T/AR) technopolymer. Resistant to alcohol, solvents, oils with additives, greases, acids and alkali.
- **Contrast screen with bimetallic thermometer**
  Graduated scale up to 100°C to read oil temperature, even when oil level is at minimum, thanks to the conductivity of the aluminium contrast screen.
- **Packing ring**
  NBR synthetic rubber O-Ring.
- **Maximum continuous working temperature**
  100°C.

Features and applications

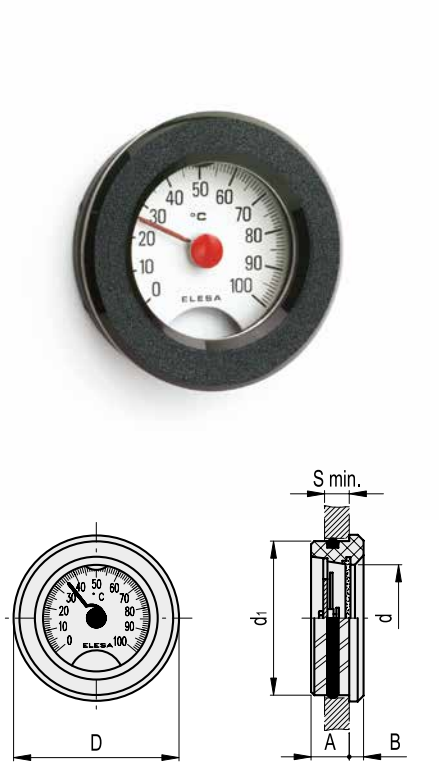
The push-fit assembly is guaranteed by optimized ribbings. Sealing is guaranteed by the O-ring. HRT/T oil level indicators push-fit are particularly suitable for assembly on reservoirs with limited pressure.

Assembly instructions

Chamfer hole 1x45° and grease slightly the outside surface of the O-ring to make assembly easier.

Note

For use with fluids containing special additives, please contact ELESA Sales Department.



Standard Elements		Main dimensions						
Code	Description	d1	A	B	D	d	Smin	g
10781	HRT.25/T-38	38	11	5	42	23	8	12
10786	HRT.40/T-60	60	11	5.5	64	40	9	29

GN 537

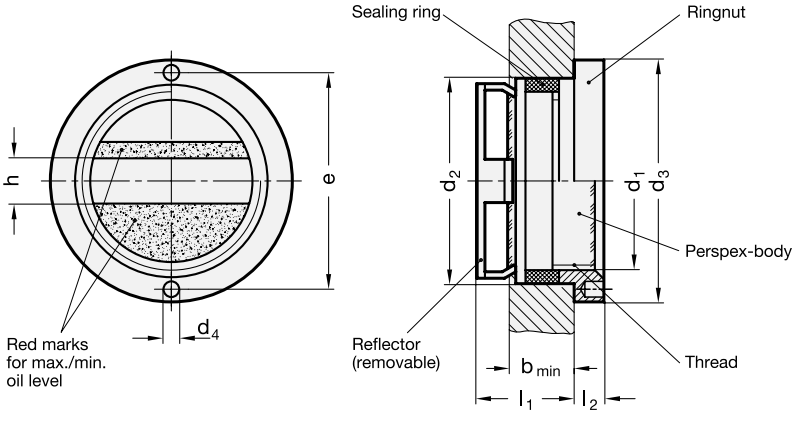
Oil level indicators

RoHS

- **Material**
  Aluminium.
- **Window**
  Plastic (PMMA) glass, resistant to temperatures up to 80°C.
- **Seal**
  NBR rubber (PERBUNAN).
- **Contrast screen**
  White plastic.
  - Execution **A**: without level limit indicator mask.
  - Execution **B**: with red oil level limit indicator.

Instructions of use

For installing GN 537 oil level sights no screw thread is required.
The oil level sight is inserted into the hole d1 to h11. By simply tightening the ring nut using the pin key the seal is pressed against the contact surface which, at the same time, will hold the sight glass in position. For removal reverse the procedure.
Their use is limited to non-pressurised or even slightly pressurised tanks.



Standard Elements	Main dimensions									Pin key for installation	⚖
Description	d1	d2	bmin.	d3	d4	e ±0.1	h	l1	l2		g
GN 537-16-20-A	16	20	9	25	2.2	21	5	15	3.5	GN 537.1-21	8
GN 537-22-28-A	22	28	10	35	3	30	6	15	4.5	GN 537.1-30	17
GN 537-32-38-A	32	38	12	45	3	40	8	18	5.5	GN 537.1-40	34
GN 537-50-58-A	50	58	14	64	3	58.5	10	22	5.5	GN 537.1-58.5	80
GN 537-16-20-B	16	20	9	25	2.2	21	5	15	3.5	GN 537.1-21	8
GN 537-22-28-B	22	28	10	35	3	30	6	15	4.5	GN 537.1-30	17
GN 537-32-38-B	32	38	12	45	3	40	8	18	5.5	GN 537.1-40	34
GN 537-50-58-B	50	58	14	64	3	58.5	10	22	5.5	GN 537.1-58.5	80

HE.

ELESA Original design

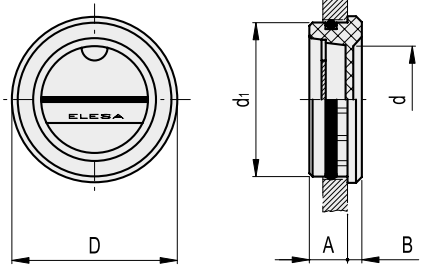
Oil level indicators push-fit

- **Material**
  Transparent high mechanical resistance polycarbonate. Resistant to acids, alkali, greases and oils. Not suitable for use with oils with additives and solvents. Avoid contact with alcohol or detergents containing alcohol.
- **Contrast screen**
  White lacquered aluminium with red level line.
- **Packing ring**
  NBR synthetic rubber O-Ring.
- **Maximum continuous working temperature**
  100°C.

Features and applications
The push-fit assembly is guaranteed by optimized ribbings. Sealing is guaranteed by the O-ring. HE. oil level indicators push-fit are particularly suitable for assembly on reservoirs with limited pressure.

Assembly instructions
Chamfer hole 1x45° and grease slightly the outside surface of the O-ring to make assembly easier.

Note
For use with fluids containing special additives, please contact ELESA Sales Department.



Standard Elements		Main dimensions						⚖
Code	Description	d1	A	B	D	d	S min.	g
11401	HE.17	17	6.5	3	18	9	5	2
11501	HE.20	20	8	3	21	12	6	3
11601	HE.26	26	7.5	3.5	28	17	6	5
11701	HE.30	30	8	4	32	20	7	7
11801	HE.35	35	9	4	38	25	8	10
11901	HE.40	40	10	4.5	43	28	9	13
12001	HE.45	45	11	5.5	47	32	9	18

HCFE.

ELESA Original design

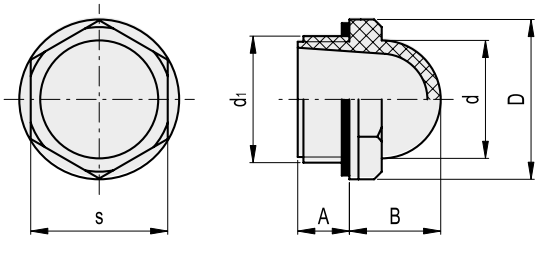
Oil circulation sights

- **Material**
  Transparent polyamide based (PA-T) technopolymer. Resistant to solvents, oils with additives, greases, acids and alkali. Avoid contact with alcohol or detergents containing alcohol.
- **Flat packing ring**
  NBR synthetic rubber.
- **Maximum continuous working temperature**
  100°C.

Accessories on request
Brass nut type GH. (see page 77) for fitting to reservoirs with wall thickness smaller than 5 mm.

Technical data
An adequate tightening torque (see table below) is recommended when screwing the oil circulation sight, so as to guarantee optimal tightness without any deformation of the packing ring. Suggested tightening torque is the result of laboratory tests at ambient temperature (23°C) with sight, packing ring and reservoir walls perfectly cleaned.

Note
For use with fluids containing special additives, please contact ELESA Sales Department.



Standard Elements		Main dimensions						Tightening torque	⚖
Code	Description	d1	A	B	D	d	s	[Nm]	g
10851	HCFE.12-3/8	G 3/8	7.5	13	22.5	15	19	3÷5	4
10901	HCFE.15-1/2	G 1/2	10.5	16	26	19	22	4÷6	5
11001	HCFE.20-3/4	G 3/4	10.5	19.5	31.5	25	27	6÷8	8
11101	HCFE.24-1	G 1	11	24	42	31	36	8÷10	18
11111	HCFE.30-1¼	G 1¼	11.5	26.5	46.5	38	40.5	12÷15	22

HCFE-EX

ELESA Original design

Oil circulation sights

- **Material**
  Transparent polyamide based (PA-T) technopolymer. Resistant to solvents, oils with additives, greases, acids and alkali. Avoid contact with alcohol or detergents containing alcohol.
- **Flat packing ring**
  NBR synthetic rubber.
- **ATEX directive compliance**
  The level indicators of the HCFE-EX series comply with Health and Safety Requirements intended in 94/9/EC ATEX European Directive (explosive atmospheres) for equipments in Group II, category 2GD.
  Level indicators have "kX" protection degree and can therefore be mounted in equipments protected by means of "immersion in liquid", without lowering protection degree.
  II 2 G D k T6, marked on the HCFE-EX level indicators, represents the identification according to ATEX directive.
  II: group of substances for which the product is suitable
  2: identification of the category
  G: identification of the type of explosive atmosphere (Gases or vapours)
  D: identification of the type of explosive atmosphere (Dust)
  k: protection degree by means of immersion in liquid
  IIB: explosive gases group (only for HCFE.20)
  T6: temperature class
  Ambient and/or fluid temperature: -30 ÷ +80°C
  The declaration of conformity to European Directives of this product is available and it is part of the product itself.

Accessories on request

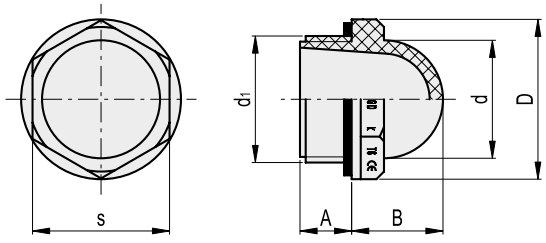
Brass nut type GH. (see page 77) for fitting to reservoirs with wall thickness smaller than 5 mm.

Technical data

The tightening torque indicated in the table guarantees an optimal tightness, keeping the packing ring in the correct position.

Note

For use with fluids containing special additives, please contact ELESA Sales Department.



Standard Elements		Main dimensions						Tightening torque	⚖
Code	Description	d1	A	B	D	d	s	[Nm]	g
10851-EX	HCFE.12-3/8-EX	G 3/8	7.5	13	22.5	15	19	3÷5	4
10901-EX	HCFE.15-1/2-EX	G 1/2	10.5	16	26	19	22	4÷6	5
11001-EX	HCFE.20-3/4-EX	G 3/4	10.5	19.5	31.5	25	27	6÷8	8

HCFE-C

ELESA Original design

Oil circulation sights

- **Material**
  Transparent polyamide based (PA-T) technopolymer. Resistant to solvents, oils with additives, greases, acids and alkali. Avoid contact with alcohol or detergents containing alcohol.
- **Circle for oil level check**
  Tampoprinted, red colour. Resistant to oils with additives, greases, alkali and white spirit; resistant to abrasions under normal working conditions. Avoid contact with solvents, alcohol or detergents containing alcohol.
- **Flat packing ring**
  NBR synthetic rubber.
- **Maximum continuous working temperature**
  100°C.

Accessories on request

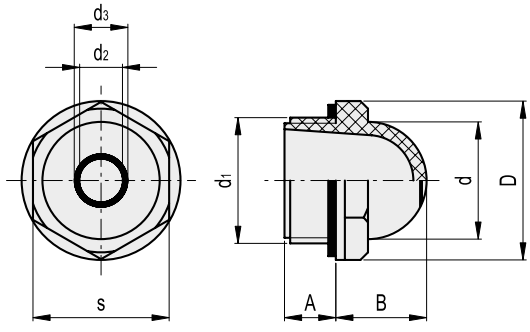
Brass nut type GH. (see page 77) for fitting to reservoirs with wall thickness smaller than 5 mm.

Technical data

An adequate tightening torque (see table below) is recommended when screwing the dome-shaped level indicator, so as to guarantee optimal tightness without any deformation of the packing ring. Suggested tightening torque is the result of laboratory tests at ambient temperature (23°C) with indicator, packing ring and reservoir walls perfectly cleaned.

Note

For use with fluids containing special additives, please contact ELESA Sales Department.



Standard Elements		Main dimensions								Tightening torque	⚖
Code	Description	d1	A	B	D	d	d2	d3	s	[Nm]	g
10906	HCFE.15/C-1/2	G 1/2	10.5	16	26	19	6	7	22	4÷6	5
11006	HCFE.20/C-3/4	G 3/4	10.5	19.5	31.5	25	11	12	27	6÷8	8
11106	HCFE.24/C-1	G 1	11	24	42	31	14	15	36	8÷10	18

HCZ.

ELESA Original design

Column level indicators

RoHS PA-T +90° -30°

- **Material**
  Transparent polyamide based (PA-T) technopolymer. Resistant to shocks, solvents, oils with additives, aliphatic and aromatic hydrocarbons, petrol, naphtha, phosphoric esters. Avoid contact with alcohol and detergents containing alcohol.
- **Screws and nuts**
  Zinc-plated steel.
- **Packing rings**
  Step-shaped for the seal on the reservoir walls and NBR synthetic rubber O-ring screw underhead.
- **Contrast screen**
  White lacquered aluminium. The housing, in the appropriate external rear slot, guarantees the best protection from direct contact with fluid, avoiding yellowing effect due to the prolonged action of the fluid at high temperatures. It can be removed before installation to fit marks and words (for example MAX-MIN) in the needed positions.
- **Protection frame**
  Glass-fibre reinforced polyamide (PA) SUPER-technopolymer, black colour, matte finish. Resistant to solvents, oils, greases and other chemical agents. Supplied assembled, removable by a screwdriver.
- **Standard executions**
  - **HCZ**: without thermometer and without protection frame.
  - **HCZ/T**: with thermometer incorporated, without protection frame.
  - **HCZ-P**: without thermometer, with protection frame.
  - **HCZ/T-P**: with thermometer incorporated and protection frame.
- **Assembly**
  - By means of the supplied set screws and nuts.
  - By means of the supplied set screws, without nuts, by tapping the two holes in the reservoir walls, if they are thick enough.

  To ensure the best sealing of the O-rings it is recommended to apply the maximum torque on the nuts as reported in the table and a roughness of the gasket application surface Ra = 3 µm.
- **Maximum continuous working temperature**
  90°C (with oil).

Special executions on request

- HCZ.127: with M10 screws and nuts.
- UV resistant transparent technopolymer indicators.

Features and performances

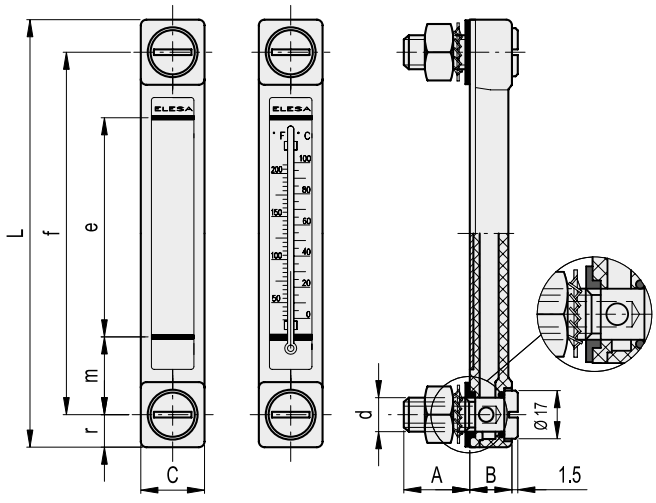
The body of the indicator, entirely in transparent material, is assembled using ultrasound welding to guarantee a perfect seal.
Maximum fluid level visibility even from side positions.
Level visibility and temperature reading magnified by lens effect.
All shocks are absorbed by the frame that transmits them directly onto the wall of the reservoir, since the indicator is suspended between the rubber packing rings.
The frame is equipped with a wide front opening and three slots on each side that, combined with the indicator made entirely of transparent material, guarantee maximum fluid level visibility even from side positions.

Technical data

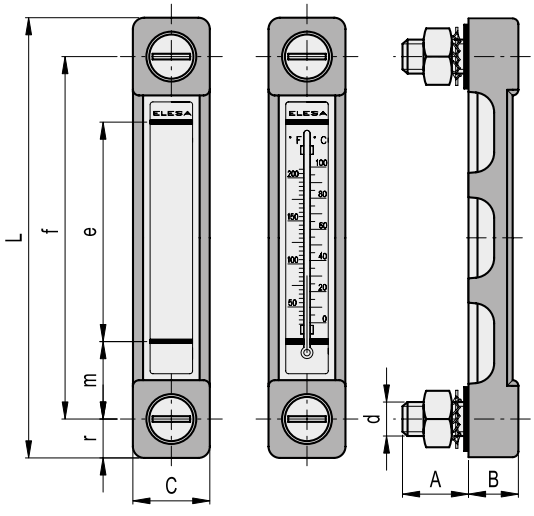
In laboratory tests carried out with mineral oil type CB68 (according to ISO 3498) at 23°C for a limited period of time, the weld stood up as follows:
- HCZ.76 18 bar
- HCZ.127 18 bar
- HCZ.254 18 bar

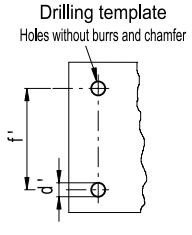
If you need to use the indicator with other oils or fluids and under different pressure and temperature conditions, please contact ELESA Technical Department. In any case we suggest to verify the suitability of the product under the actual working conditions.

HCZ HCZ/T



HCZ-P HCZ/T-P





Standard Elements		Main dimensions									Mounting holes		Thermometer scale		C #	⚖
Code	Description	f	d	A	B	C	L	e	m	r	d' -0.2	f' ±0.2	°C	°F	[Nm]	g
11382	HCZ.76	76	M10	22	15	22	99	40	18	11.5	10.5	76	-	-	12	90
11383	HCZ.76/T	76	M10	22	15	22	99	40	18	11.5	10.5	76	20÷100	68÷210	12	91
11385	HCZ.127	127	M12	22	15	22	150	80	23	11.5	12.5	127	-	-	12	120
11386	HCZ.127/T	127	M12	22	15	22	150	80	23	11.5	12.5	127	0÷100	32÷210	12	121
11388	HCZ.254	254	M12	22	15	24	279	160	23	12.5	12.5	254	-	-	12	150
11389	HCZ.254/T	254	M12	22	15	24	279	160	23	12.5	12.5	254	0÷100	32÷210	12	170
11392	HCZ.76-P	76	M10	22	17.5	27	105	40	18	14.5	10.5	76	-	-	12	101
11393	HCZ.76/T-P	76	M10	22	17.5	27	105	40	18	14.5	10.5	76	20÷100	68÷210	12	102
11395	HCZ.127-P	127	M12	22	17.5	27	156	80	23	14.5	12.5	127	-	-	12	138
11396	HCZ.127/T-P	127	M12	22	17.5	27	156	80	23	14.5	12.5	127	0÷100	32÷210	12	139
11398	HCZ.254-P	254	M12	22	17.5	29	285	160	23	15.5	12.5	254	-	-	12	150
11399	HCZ.254/T-P	254	M12	22	17.5	29	285	160	23	15.5	12.5	254	0÷100	32÷210	12	150

Maximum tightening torque.

HCZ-VT

ELESA Original design

Column level indicators technopolymer assembly screws

PA-T PA +90° -30° RoHS

- **Material**
  Transparent polyamide based (PA-T) technopolymer. Highly resistant to shocks, solvents, oils with additives, aliphatic and aromatic hydrocarbons, petrol, naphtha, phosphoric esters.
  Avoid contact with alcohol or detergents containing alcohol.
- **Screws**
  Glass-fibre reinforced SUPER-polyamide based (PA) technopolymer, lightweight and high mechanical strength.
  Anticorrosive material: suitable even in the presence of liquid or humidity.
  Resistant to several washing cycles with solvents and detergents, for this reason it is suitable for applications as in the pharmaceutical or food industry.
- **Nuts and washers**
  AISI 304 stainless steel.
- **Packing rings**
  Step-shaped for the seal on the reservoir walls and NBR synthetic rubber O-ring screw underhead.
- **Contrast screen**
  White lacquered aluminium. The housing, in the appropriate external rear slot, guarantees the best protection from direct contact with fluid, avoiding yellowing effect due to the prolonged action of the fluid at high temperatures. It can be removed before installation to fit marks and words (for example MAX-MIN), in the needed positions.
- **Protection frame**
  Glass-fibre reinforced polyamide (PA) SUPER-technopolymer, black colour, matte finish. Resistant to solvents, oils, greases and other chemical agents. Supplied assembled, removable by a screwdriver.
- **Standard executions**
  - **HCZ-VT**: without thermometer and without protection frame.
  - **HCZ/T-VT**: with thermometer incorporated, without protection frame.
  - **HCZ-P-VT**: without thermometer, with protection frame.
  - **HCZ/T-P-VT**: with thermometer incorporated and protection frame.
- **Assembly**
  - By means of the supplied set screws and nuts.
  - By means of the supplied set screws, without nuts, by tapping the two holes in the reservoir walls, if they are thick enough.

  To ensure the best sealing of the O-rings it is recommended to apply the maximum torque on the nuts as reported in the table and a roughness of the application surface of the packing ring Ra = 3 µm.
- **Maximum continuous working temperature**
  90°C (with oil).

Special executions on request

UV resistant transparent technopolymer indicators.

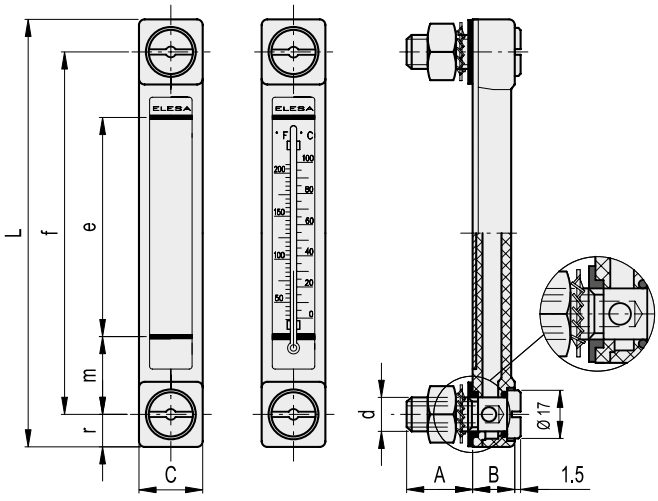
Features and performances

Thanks to the SUPER-technopolymer screws, HCZ-VT column level indicator can be used in corrosion resistance applications where stainless steel is not necessary.
The special slotted head of the SUPER-technopolymer screws is especially designed to reach an optimum tightening of the packing rings by applying an adequate tightening torque (ELESA patent) thus avoiding unnecessary stress to the screws.
The body of the indicator, entirely in transparent material, is assembled using ultrasound welding to guarantee a perfect seal.
Level visibility and temperature reading magnified by lens effect.
Special side openings provide maximum fluid level visibility even from side positions.
The protection frame is suitable for further increasing the resistance to shocks. These shocks are absorbed by the protection frame that transmits them directly onto the wall of the reservoir.

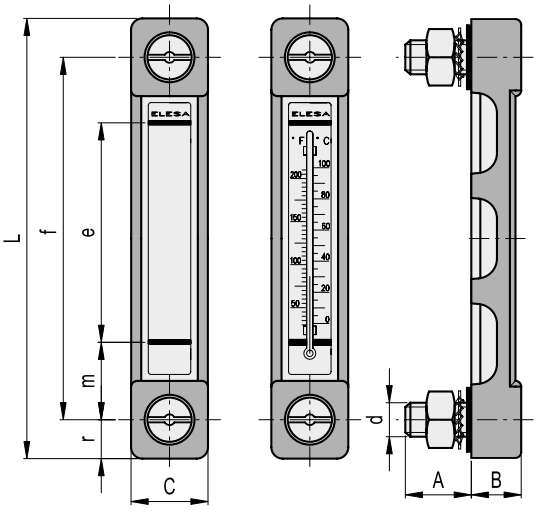
Technical data

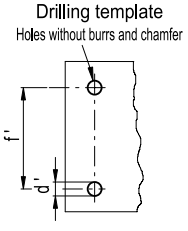
Considering the SUPER-technopolymer screws, the maximum working pressure cannot be higher than 5 bar at 20°C and 2 bar at 90°C.
For higher pressure values use HCZ-SST with stainless steel screws.

HCZ-VT HCZ/T-VT



HCZ-P-VT HCZ/T-P-VT





Standard Elements		Main dimensions									Mounting holes		Thermometer scale		C #	⚖
Code	Description	f	d	A	B	C	L	e	m	r	d' -0.2	f' ±0.2	°C	°F	[Nm]	g
111382	HCZ.76-VT-M12	76	M12	23.5	15	22	99	40	18	11.5	12.5	76	-	-	6	67
111383	HCZ.76/T-VT-M12	76	M12	23.5	15	22	99	40	18	11.5	12.5	76	20÷100	68÷210	6	68
111385	HCZ.127-VT-M12	127	M12	23.5	15	22	150	80	23	11.5	12.5	127	-	-	6	78
111386	HCZ.127/T-VT-M12	127	M12	23.5	15	22	150	80	23	11.5	12.5	127	0÷100	32÷210	6	79
111388	HCZ.254-VT-M12	254	M12	23.5	15	24	279	160	23	12.5	12.5	254	-	-	6	110
111389	HCZ.254/T-VT-M12	254	M12	23.5	15	24	279	160	23	12.5	12.5	254	0÷100	32÷210	6	111
111392	HCZ.76-P-VT-M12	76	M12	23.5	17.5	27	105	40	18	14.5	12.5	76	-	-	6	85
111393	HCZ.76/T-P-VT-M12	76	M12	23.5	17.5	27	105	40	18	14.5	12.5	76	20÷100	68÷210	6	86
111395	HCZ.127-P-VT-M12	127	M12	23.5	17.5	27	156	80	23	14.5	12.5	127	-	-	6	104
111396	HCZ.127/T-P-VT-M12	127	M12	23.5	17.5	27	156	80	23	14.5	12.5	127	0÷100	32÷210	6	105
111398	HCZ.254-P-VT-M12	254	M12	23.5	17.5	29	285	160	23	15.5	12.5	254	-	-	6	169
111399	HCZ.254/T-P-VT-M12	254	M12	23.5	17.5	29	285	160	23	15.5	12.5	254	0÷100	32÷210	6	170

Maximum tightening torque.

HCX.

ELESA Original design

Column level indicators

RoHS PA-T +90° -30°

- **Material**
  Transparent polyamide based (PA-T) technopolymer. Highly resistant to shocks, solvents, oils with additives, aliphatic and aromatic hydrocarbons, petrol, naphtha, phosphoric esters. Avoid contact with alcohol or detergents containing alcohol.
- **Screws, nuts and washers**
  Zinc-plated steel.
- **Packing rings**
  NBR synthetic rubber O-Ring.
- **Contrast screen**
  White lacquered aluminium. The housing, in the appropriate external rear slot, guarantees the best protection from direct contact with fluid, avoiding yellowing effect due to the prolonged action of the fluid at high temperatures. It can be removed before installation to fit marks and words (for example MAX-MIN).
- **Thermometer**
  HCX/T: incorporated thermometer for temperature reading.
- **Assembly**
  - When nuts can be fitted from the inside of the reservoir, by means of the supplied set screws and nuts.
  - When nuts cannot be fitted from the inside of the reservoir and the walls are thick enough, by means of the supplied set screws, without nuts, by tapping the two holes in the reservoir walls.
  - When nuts cannot be fitted from the inside of the reservoir and the walls are not thick enough, by means of the supplied set screws and the Fast Mounting Kit (see page) (for HCX.76 and HCX.127).

  To ensure the best sealing of the O-rings it is recommended to apply the maximum torque on the nuts as reported in the table and a roughness of the gasket application surface Ra = 3 µm.
- **Maximum continuous working temperature**
  90°C (with oil).

Features and performances

Assembled using ultrasound welding to guarantee a perfect seal. Entirely in transparent material: maximum fluid level visibility even from side positions. Visibility and temperature reading magnified by lens effect.

Technical data

In laboratory tests carried out with mineral oil for hydraulic systems type CB68 (according to ISO 3498) with gradually increasing pressure, at 23°C, the weld stood up as follows:
- HCX.76 18 bar
- HCX.127 18 bar
- HCX.254 12 bar

In any case we suggest to verify the suitability of the product under the actual working conditions. If you need to use the indicator with other oils or fluids and under different pressure and temperature conditions, please contact ELESA Technical Department or carry out tests in order to guarantee a proper use.

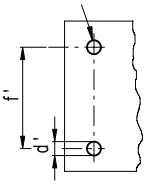
Special executions on request

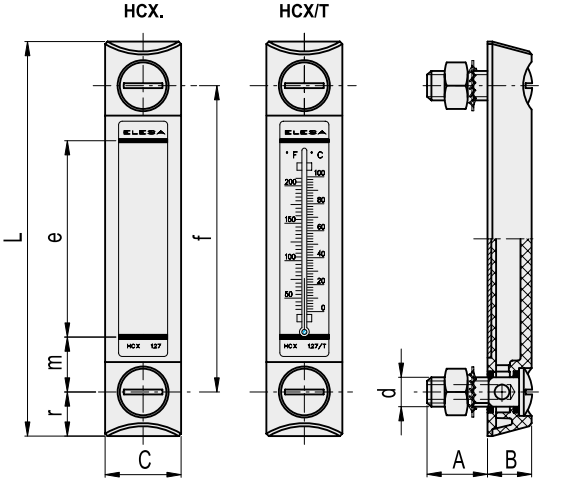
- UV resistant transparent technopolymer indicators.
- Indicators with two red ball-shaped floats (only for HCX executions).

Other standard executions

- HCX-AR (see page 91) for use with fluids containing alcohol.
- HCX-BW-SST (see page 90) for use with hot water.
- Indicators with two red ball-shaped floats (only for HCX executions).

Drilling template
Holes without burrs and chamfer





Drilling and installation data			
Description	**d'-0.2**	**f'±0.2**	**Maximum tightening torque [Nm]**
HCX.76	10.5	76	12
HCX.127 (M10)	10.5	127	12
HCX.127 (M12)	12.5	127	12
HCX.254	12.5	254	10

Standard Elements		Main dimensions									Thermometer scale		
Code	**Description**	**f**	**d**	**A**	**B**	**C**	**L**	**e**	**m**	**r**	**°C**	**°F**	**g**
11341	HCX.76-M10	76	M10	22	16	27	107	40	18	15.5	-	-	87
11346	HCX.76/T-M10	76	M10	22	16	27	107	40	18	15.5	20÷100	68÷210	87
11349	HCX.127-M10	127	M10	23	18	31	161	80	23	17	-	-	138
11354	HCX.127/T-M10	127	M10	23	18	31	161	80	23	17	0÷100	32÷210	138
11351	HCX.127-M12	127	M12	23	18	31	161	80	23	17	-	-	138
11356	HCX.127/T-M12	127	M12	23	18	31	161	80	23	17	0÷100	32÷210	138
11361	HCX.254-M12	254	M12	21	18	35	291	203	26	18.5	-	-	185
11366	HCX.254/T-M12	254	M12	21	18	35	291	203	26	18.5	0÷100	32÷210	185

HCX-P

ELESA Original design

Column level indicators with protection frame

RoHS PA-T +90° -30°

- **Material**
  Transparent polyamide based (PA-T) technopolymer. Highly resistant to shocks, solvents, oils with additives, aliphatic and aromatic hydrocarbons, petrol, naphtha, phosphoric esters. Avoid contact with alcohol or detergents containing alcohol.
- **Protection frame**
  Zinc-alloy, sandblasted and treated finish.
- **Screws, nuts and washers**
  Zinc-plated steel.
- **Packing rings**
  NBR synthetic rubber.
- **Contrast screen**
  White lacquered aluminium. The housing, in the appropriate external rear slot, guarantees the best protection from direct contact with fluid, avoiding yellowing effect due to the prolonged action of the fluid at high temperatures. It can be removed before installation to fit marks and words (for example MAX-MIN).
- **Thermometer**
  HCX/T+P: incorporated thermometer for temperature reading.
- **Assembly**
  - When nuts can be fitted from the inside of the reservoir, by means of the supplied set screws and nuts.
  - When nuts cannot be fitted from the inside of the reservoir and the walls are thick enough, by means of the supplied set screws, without nuts, by tapping the two holes in the reservoir walls.
  - When nuts cannot be fitted from the inside of the reservoir and the walls are not thick enough, by means of the supplied set screws and the Fast Mounting Kit (see page) .

  To ensure the best sealing of the O-rings it is recommended to apply the maximum torque on the nuts as reported in the table and a roughness of the gasket application surface Ra = 3 µm.
- **Maximum continuous working temperature**
  90°C (with oil).

Special executions on request

- Level indicators for use with fluids containing alcohol or with hot water.
- Indicators with two red ball-shaped floats (only for HCX-P executions).

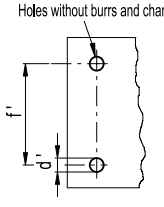
Features and performances

Assembled using ultrasound welding to guarantee a perfect seal. The frame is equipped with a wide front opening and three slots on each side that, combined with the indicator made entirely of transparent material, guarantee maximum fluid level visibility even from side positions. Visibility and temperature reading magnified by lens effect.
All shocks are absorbed by the frame that transmits them directly onto the wall of the reservoir, since the indicator is suspended between the rubber packing rings.

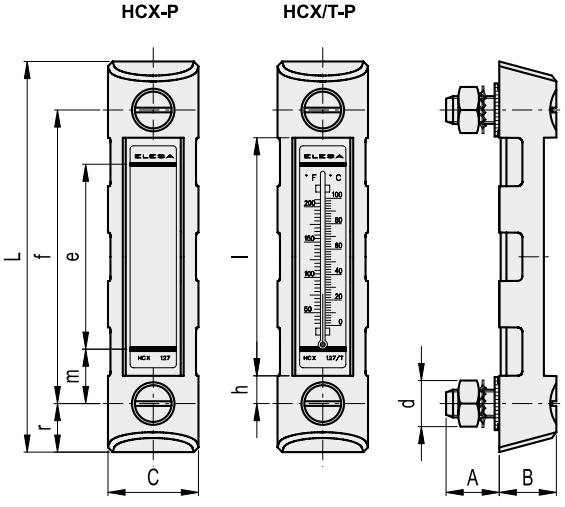
Technical data

During breaking strength tests performed in ELESA laboratories, the indicator with the frame withstood violent shocks up to 35 J.
In laboratory tests carried out with mineral oil for hydraulic systems type CB68 (according to ISO 3498) with gradually increasing pressure, at 23°C, the weld stood up to 18 bar.
In any case we suggest to verify the suitability of the product under the actual working conditions. If you need to use the indicator with other oils or fluids and under different pressure and temperature conditions, please contact ELESA Technical Department or carry out tests in order to guarantee a proper use.

Drilling template
Holes without burrs and chamfer



HCX-P HCX/T-P



Drilling and installation data			
Description	d'-0.2	f'±0.2	Maximum tightening torque [Nm]
HCX.127	12.5	127	12

Standard Elements		Main dimensions											⚖
Code	Description	f	d	A	B	C	L	e	h	l	m	r	g
11371	HCX.127-P-M12	127	M12	23	25	39	169	80	12	103	23	21	279
11376	HCX.127/T-P-M12	127	M12	23	25	39	169	80	12	103	23	21	281

HCX-SST

INOX Stainless Steel

ELESA Original design

Column level indicators stainless steel assembly screws

PA-T +90° -30° RoHS

- **Material**
  Transparent polyamide based (PA-T) technopolymer. Highly resistant to shocks, solvents, oils with additives, aliphatic and aromatic hydrocarbons, petrol, naphtha, phosphoric esters. Avoid contact with alcohol or detergents containing alcohol.
- **Screws, nuts and washers**
  AISI 303 stainless steel screws, AISI 304 stainless steel nuts and washers.
- **Packing rings**
  FKM (type VITON®, registered trade mark of DuPont Dow Elastomers) O-Ring.
- **Contrast screen**
  White lacquered aluminium. The housing, in the appropriate external rear slot, guarantees the best protection from direct contact with fluid, avoiding yellowing effect due to the prolonged action of the fluid at high temperatures. It can be removed before installation to fit marks and words (for example MAX-MIN).
- **Thermometer**
  HCX/T-INOX: incorporated thermometer for temperature reading.
- **Assembly**
  - When nuts can be fitted from the inside of the reservoir, by means of the supplied set screws and nuts.
  - When nuts cannot be fitted from the inside of the reservoir and the walls are thick enough, by means of the supplied set screws, without nuts, by tapping the two holes in the reservoir walls.

  To ensure the best sealing of the O-rings it is recommended to apply the maximum torque on the nuts as reported in the table and a roughness of the gasket application surface Ra = 3 µm.
- **Maximum continuous working temperature**
  90°C (with oil).

Features and performances

Assembled using ultrasound welding to guarantee a perfect seal. Entirely in transparent material: maximum fluid level visibility even from side positions. Visibility and temperature reading magnified by lens effect.

Technical data

In laboratory tests carried out with mineral oil for hydraulic systems type CB68 (according to ISO 3498) with gradually increasing pressure, at 23°C, the weld stood up as follows:
- HCX.76-INOX 18 bar
- HCX.127-INOX 18 bar
- HCX.254-INOX 12 bar

In any case we suggest to verify the suitability of the product under the actual working conditions. If you need to use the indicator with other oils or fluids and under different pressure and temperature conditions, please contact ELESA Technical Department or carry out tests in order to guarantee a proper use.

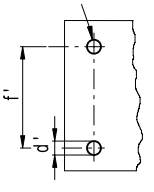
Special executions on request

- UV resistant transparent technopolymer indicators.
- Indicators with two red ball-shaped floats (only for HCX-SST executions).

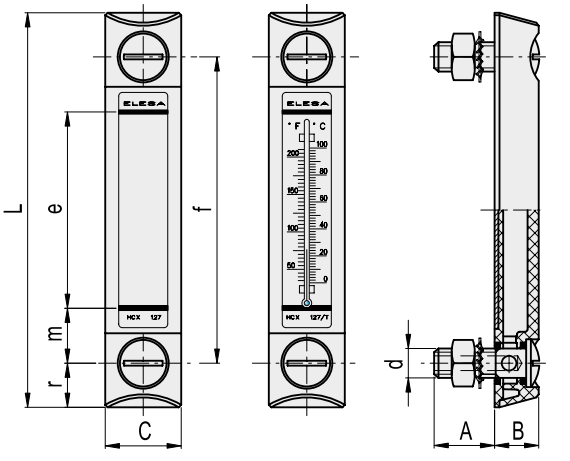
Other standard executions

- HCX-AR (see page 91) for use with fluids containing alcohol.
- HCX-BW-SST (see page 90) for use with hot water.

Drilling template
Holes without burrs and chamfer



HCX-SST HCX/T-SST



Drilling and installation data			
Description	**d'-0.2**	**f'±0.2**	**Maximum tightening torque [Nm]**
HCX.76	10.5	76	12
HCX.127	12.5	127	12
HCX.254	12.5	254	10

Standard Elements		Main dimensions									Thermometer scale		⚖
Code	**Description**	**f**	**d**	**A**	**B**	**C**	**L**	**e**	**m**	**r**	**°C**	**°F**	**g**
11343	HCX.76-SST-M10	76	M10	22	16	27	107	40	18	15.5	-	-	87
11348	HCX.76/T-SST-M10	76	M10	22	16	27	107	40	18	15.5	20÷100	68÷210	87
11353	HCX.127-SST-M12	127	M12	23	18	31	161	80	23	17	-	-	138
11358	HCX.127/T-SST-M12	127	M12	23	18	31	161	80	23	17	0÷100	32÷210	138
11363	HCX.254-SST-M12	254	M12	21	18	35	291	203	26	18.5	-	-	185
11368	HCX.254/T-SST-M12	254	M12	21	18	35	291	203	26	18.5	0÷100	32÷210	185

HCX-VT

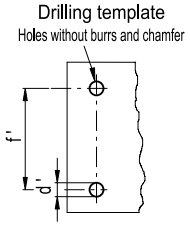
ELESA Original design

Column level indicators technopolymer assembly screws

PA-T PA +90° -30° RoHS

- **Material**
  Transparent polyamide based (PA-T) technopolymer. Highly resistant to shocks, solvents, oils with additives, aliphatic and aromatic hydrocarbons, petrol, naphtha, phosphoric esters. Avoid contact with alcohol or detergents containing alcohol.
- **Screws**
  Glass-fibre reinforced polyamide based (PA) technopolymer.
- **Nuts and whashers**
  Zinc-plated steel (on request stainless steel).
- **Packing rings**
  NBR synthetic rubber (on request FKM) O-Ring.
- **Contrast screen**
  White lacquered aluminium. The housing, in the appropriate external rear slot, guarantees the best protection from direct contact with fluid, avoiding yellowing effect due to the prolonged action of the fluid at high temperatures. It can be removed before installation to fit marks and words (for example MAX-MIN).
- **Thermometer**
  HCX/T-VT: incorporated thermometer for temperature reading.
- **Assembly**
  - When nuts can be fitted from the inside of the reservoir, by means of the supplied set screws and nuts.
  - When nuts cannot be fitted from the inside of the reservoir and the walls are thick enough, by means of the supplied set screws, without nuts, by tapping the two holes in the reservoir walls.
  - When nuts cannot be fitted from the inside of the reservoir and the walls are not thick enough, by means of the supplied set screws and the Fast Mounting Kit (see page) (for HCX.127).

  To ensure the best sealing of the O-rings it is recommended to apply the maximum torque on the nuts as reported in the table and a roughness of the gasket application surface Ra = 3 µm.
- **Maximum continuous working temperature**
  90°C (with oil).



Features and performances

Thanks to the technopolymer screws, HCX/VT column level indicator can be used in corrosion resistance applications where stainless steel is not necessary. The special slotted head of the technopolymer screws is especially designed to reach an optimum tightening of the packing rings by applying an adequate tightening torque (ELESA patent) thus avoiding unnecessary stress to the screws. Assembled using ultrasound welding to guarantee a pefect seal. Entirely in transparent material: maximum fluid level visibility even from side positions. Visibility and temperature reading magnified by lens effect.

Technical data

In laboratory tests carried out with mineral oil for hydraulic systems type CB68 (according to ISO 3498) with gradually increasing pressure, at 23°C, the weld stood up as follows:
- HCX.127-VT 18 bar
- HCH.254-VT 12 bar

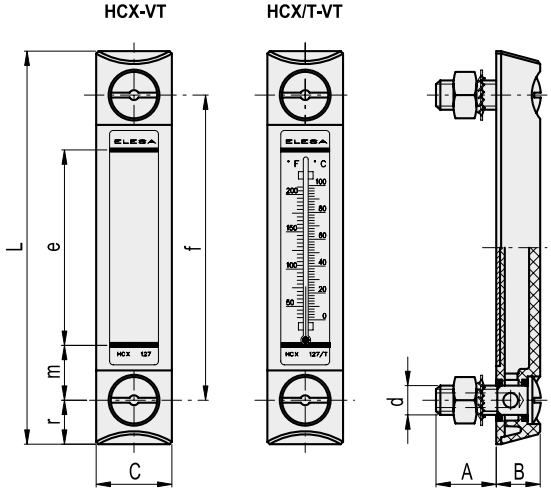
Maximum working pressure at 20°C 5 bar.
Maximum working pressure at 90°C 2 bar.
In any case we suggest to verify the suitability of the product under the actual working conditions. If you need to use the indicator with other oils or fluids and under different pressure and temperature conditions, please contact ELESA Technical Department or carry out tests in order to guarantee a proper use.

Special executions on request

- UV resistant transparent technopolymer indicators.
- Indicators with two red ball-shaped floats (only for HCX-VT executions).

Other standard executions

- HCX-AR (see page 91) for use with fluids containing alcohol.
- HCX-BVV-SST (see page 90) for use with hot water.



Drilling and installation data			
Description	**d'-0.2**	**f'±0.2**	**Maximum tightening torque [Nm]**
HCX.127	12.5	127	6
HCX.254	12.5	254	6

Standard Elements		Main dimensions									Thermometer scale		⚖
Code	**Description**	**f**	**d**	**A**	**B**	**C**	**L**	**e**	**m**	**r**	**°C**	**°F**	**g**
111351	HCX.127-VT-M12	127	M12	23	18	31	161	80	23	17	-	-	94
111361	HCX.127/T-VT-M12	127	M12	23	18	31	161	80	23	17	0÷100	32÷210	94
111371	HCX.254-VT-M12	254	M12	21	18	35	291	203	26	18.5	-	-	141
111381	HCX.254/T-VT-M12	254	M12	21	18	35	291	203	26	18.5	0÷100	32÷210	141

HCX-BW-SST

INOX Stainless Steel

ELESA Original design

Column level indicators for hot water

RoHS PA-T +80° -20°

- **Material**
  Transparent polyamide based (PA-T) technopolymer. Highly resistant to shocks, solvents, oils with additives, aliphatic and aromatic hydrocarbons, petrol, naphtha, phosphoric esters. Avoid contact with alcohol or detergents containing alcohol.
  The special technopolymer used for HCX-BW column level indicator allows to use it even in circuits working with very hot water and prevents milk effect on the transparent surface.
- **Screws, nuts and washers**
  AISI 303 stainless steel screws, AISI 304 stainless steel nuts and washers.
- **Packing rings**
  FKM (type VITON®, registered trade mark of DuPont Dow Elastomers) O-Ring.
- **Contrast screen**
  White lacquered aluminium. The housing, in the appropriate external rear slot, guarantees the best protection from direct contact with fluid, avoiding yellowing effect due to the prolonged action of the fluid at high temperatures. It can be removed before installation to fit marks and words (for example MAX-MIN).
- **Assembly**
  - When nuts can be fitted from the inside of the reservoir, by means of the supplied set screws and nuts.
  - When nuts cannot be fitted from the inside of the reservoir and the walls are thick enough, by means of the supplied set screws, without nuts, by tapping the two holes in the reservoir walls.

  To ensure the best sealing of the O-rings it is recommended to apply the maximum torque on the nuts as reported in the table and a roughness of the gasket application surface Ra = 3 µm.
- **Maximum continuous working temperature**
  80°C with peaks of 90°C.

Features and performances

Assembled using ultrasound welding to guarantee a perfect seal. Entirely in transparent material: maximum fluid level visibility even from side positions. Visibility magnified by lens effect.

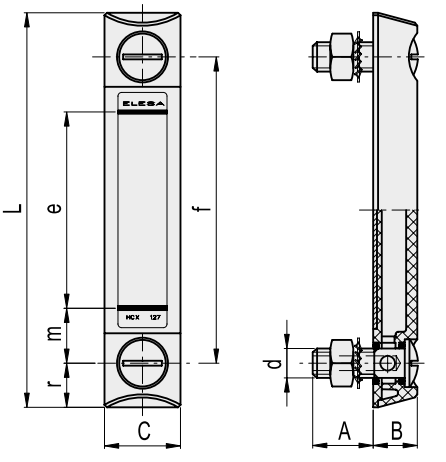
Technical data

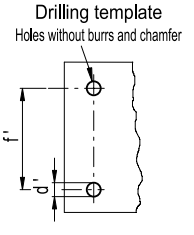
In laboratory tests carried out with mineral oil for hydraulic systems type CB68 (according to ISO 3498) with gradually increasing pressure, at 23°C, the weld stood up as follows:
- HCX.76-INOX-BW 10 bar
- HCX.127-INOX-BW 10 bar
- HCX.254-INOX-BW 10 bar

In any case we suggest to verifiy the suitability of the product under the actual working conditions. If you need to use the indicator with other fluids and under different pressure and temperatures conditions, please contact ELESA Technical Department or carry out tests in order to guarantee a proper use.

Special executions on request

Indicators with two red ball-shaped floats.





Drilling and installation data			
Description	d'-0.2	f'±0.2	Maximum tightening torque [Nm]
HCX.76	10.5	76	8
HCX.127	12.5	127	8
HCX.254	12.5	254	8

Standard Elements		Main dimensions									⚖
Code	Description	f	d	A	B	C	L	e	m	r	g
11345	HCX.76-BW-SST-M10	76	M10	22	16	27	107	40	18	15.5	87
11355	HCX.127-BW-SST-M12	127	M12	23	18	31	161	80	23	17	138
11365	HCX.254-BW-SST-M12	254	M12	21	18	35	291	203	26	18.5	185

HCX-AR

ELESA Original design

Column level indicators for use with fluids containing alcohol

RoHS PA-T AR +80° -30°

- **Material**
  Transparent polyamide based (PA-T/AR) technopolymer. Highly resistant to shocks, solvents, oils with additives, aliphatic and aromatic hydrocarbons, petrol, naphtha, phosphoric esters, additives and detergents containing alcohol.
- **Screws, nuts and washers**
  Zinc-plated steel.
- **Packing rings**
  NBR synthetic rubber O-Ring.
- **Contrast screen**
  White lacquered aluminium. The housing, in the appropriate external rear slot, guarantees the best protection from direct contact with fluid, avoiding yellowing effect due to the prolonged action of the fluid at high temperatures. It can be removed before installation to fit marks and words (for example MAX-MIN).
- **Thermometer**
  HCX/T-AR: incorporated thermometer for temperature reading.
- **Assembly**
  - When nuts can be fitted from the inside of the reservoir, by means of the supplied set screws and nuts.
  - When nuts cannot be fitted from the inside of the reservoir and the walls are thick enough, by means of the supplied set screws, without nuts, by tapping the two holes in the reservoir walls.
  - When nuts cannot be fitted from the inside of the reservoir and the walls are not thick enough, by means of the supplied set screws and the Fast Mounting Kit (see page) (for HCX.76 and HCX.127).

  To ensure the best sealing of the O-rings it is recommended to apply the maximum torque on the nuts as reported in the table and a roughness of the gasket application surface Ra = 3 µm.
- **Maximum continuous working temperature**
  80°C.

Features and performances

Assembled using ultrasound welding to guarantee a perfect seal. Entirely in transparent material: maximum fluid level visibility even from side positions. Visibility and temperature reading magnified by lens effect.

Technical data

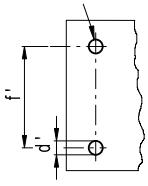
In laboratory tests carried out with mineral oil for hydraulic systems type CB68 (according to ISO 3498) with gradually increasing pressure, at 23°C, the weld stood up as follows:
- HCX.76-AR 13 bar
- HCX.127-AR 13 bar
- HCX.254-AR 10 bar

In any case we suggest to verify the suitability of the product under the actual working conditions. If you need to use the indicator with other oils or fluids and under different pressure and temperature conditions, please contact ELESA Technical Department or carry out tests in order to guarantee a proper use.

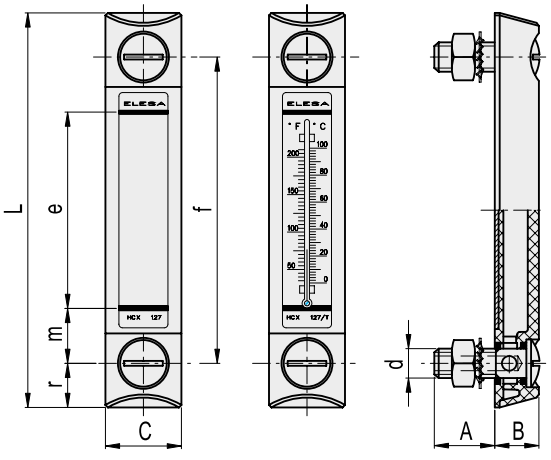
Special executions on request

Indicators with two red ball-shaped floats (only for HCX-AR executions)

Drilling template
Holes without burrs and chamfer



HCX-AR HCX/T-AR



Drilling and installation data			
Description	d'-0.2	f'±0.2	Maximum tightening torque [Nm]
HCX.76	10.5	76	8
HCX.127	12.5	127	8
HCX.254	12.5	254	8

Standard Elements		Main dimensions									Thermometer scale		⚖
Code	Description	f	d	A	B	C	L	e	m	r	°C	°F	g
11342	HCX.76-AR-M10	76	M10	22	16	27	107	40	18	15.5	-	-	87
11347	HCX.76/T-AR-M10	76	M10	22	16	27	107	40	18	15.5	20÷100	68÷210	87
11352	HCX.127-AR-M12	127	M12	23	18	31	161	80	23	17	-	-	138
11357	HCX.127/T-AR-M12	127	M12	23	18	31	161	80	23	17	0÷100	32÷210	138
11362	HCX.254-AR-M12	254	M12	21	18	35	291	203	26	18.5	-	-	185
11367	HCX.254/T-AR-M12	254	M12	21	18	35	291	203	26	18.5	0÷100	32÷210	185

HCX-LT

ELESA Original design

Column level indicator with float for indirect level reading

PA-T | +90° -30° | RoHS

- **Material**
  Transparent polyamide based (PA-T) technopolymer. Highly resistant to shocks, solvents, oils with additives, aliphatic and aromatic hydrocarbons, petrol, naphtha and phosphoric esters. Avoid contact with alcohol or detergents containing alcohol.
- **Screws, nuts and washers**
  Zinc-plated steel.
- **Packing rings**
  NBR synthetic rubber O-Ring.
- **Float**
  Ebonite, black colour.
- **Contrast screen**
  White lacquered aluminium. The housing, in the appropriate external rear slot, guarantees the best protection from direct contact with fluid, avoiding yellowing effect due to the prolonged action of the fluid at high temperatures. It can be removed before installation to fit marks and words (for example MAX-MIN).
- **Assembly**
  - When nuts can be fitted from the inside of the reservoir, by means of the supplied set screws and nuts.
  - When nuts cannot be fitted from the inside of the reservoir and the walls are thick enough, by means of the supplied set screws, without nuts, by tapping the two holes in the reservoir walls.

  To ensure the best sealing of the O-rings it is recommended to apply the maximum torque on the nuts as reported in the table and a roughness of the gasket application surface Ra = 3 µm.
- **Maximum continuous working temperature**
  90°C (with oil).

Features and performances

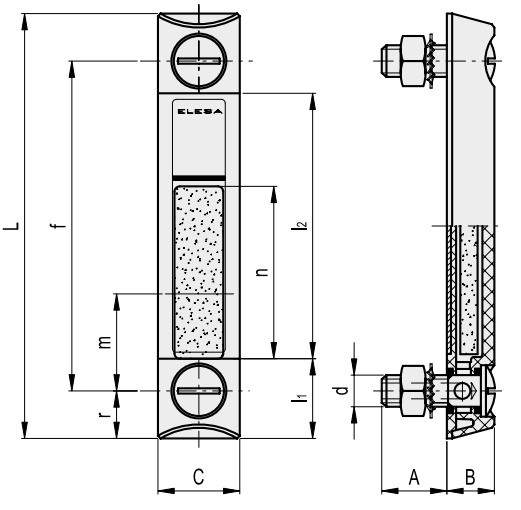
HCX/LT column level indicator allows the oil level reading by means of a float when, due to the particular design of the system, the level cannot be seen directly from the lower part of the indicator.
The plastic foam float is moved upward by the oil contained in the reservoir. This system allows an indirect reading of the oil level. The red line on the lacquered contrast screen is visible only when the float is in its lowest position (minimun oil level).
Assembled using ultrasound welding to guarantee a perfect seal. Entirely in transparent material: maximum fluid level visibility even from side positions. Visibility magnified by lens effect.

Assembly instructions

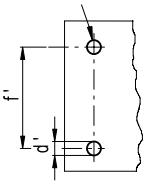
To ensure proper assembly of the indicator, please follow these instructions:
1. Set the minimum oil level of your reservoir.
2. Drill two holes on the reservoir wall. The lower hole axis should be drilled at "m" distance (see table) under the minimum oil level.
   "m" is the minimum oil level allowed. This is the level from which the float starts to be moved upward. The value "m" is calculated with an oil density of 875 Kg/m³ at 15°C. If the red line of the contrast screen appears, the oil level is under its minimum level allowed.

Technical data

In laboratory tests carried out with mineral oil for hydraulic systems type CB68 (according to ISO 3498) with gradually increasing pressure, at 23°C, the weld stood up to 12 bar.
In any case we suggest to verify the suitability of the product under the actual working conditions. If you need to use the indicator with other oils or fluids and under different pressure and temperature conditions, please contact ELESA Technical Department or carry out tests in order to guarantee a proper use.



Drilling template
Holes without burrs and chamfer



Drilling and installation data			
Description	**d'-0.2**	**f'±0.2**	**Maximum tightening torque [Nm]**
HCX.127	12.5	254	6

Standard Elements		Main dimensions											⚖
Code	**Description**	**f**	**d**	**A**	**B**	**C**	**L**	**l1**	**l2**	**m***	**n**	**r**	**g**
11364	HCX.254-LT-M12	254	M12	21	18	35	291	32	225	46	140	18.5	215

* See Assembly instructions.

FM Kit

Fast Mounting Kit

RoHS NBR

- **Nut**
  Zinc-plated steel.
- **Packing ring**
  NBR synthetic rubber.

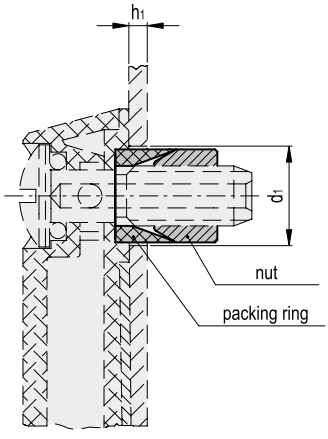
Features

The Fast Mounting Kit has been designed for mounting level indicators series HCX. (measures 76,127 and 254) from the outside when nuts cannot be fitted from the inside of the reservoir.

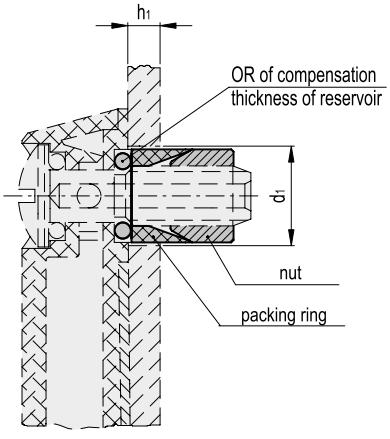
Assembly of the indicator with the Fast Mounting Kit

1. Follow the assembly data reported in the table.
2. Make sure that the hole in the plate does not have any burs, especially inside the reservoir.
3. Before assembly the indicator on the reservoir, slightly tighten the nut by hand against the packing ring. We advise you, then, to deform slightly the threaded end of the screw in order to prevent the nut from falling into the reservoir while disassembling the indicator.
4. To disassemble the indicator from the reservoir, just rotate the screw 3/4 of a turn keeping the plastic part of the indicator under tension (pulling).

1.5 < h_1 < 4.7
(assembly without O-ring)



4.7 < h_1 < 6.3
(assembly with O-ring)



Standard Elements		d_1 +0.1	Without O-Ring		With O-Ring		Maximum tightening torque
Code	Description		h_1 min	h_1 max	h_1 min	h_1 max	
31801	FM-HCX.76-M10-KIT	16	1.5	4.7	4.7	6.3	7
31811	FM-HCX.127-254-M12-KIT	17.5	1.5	4.7	4.7	6.3	7

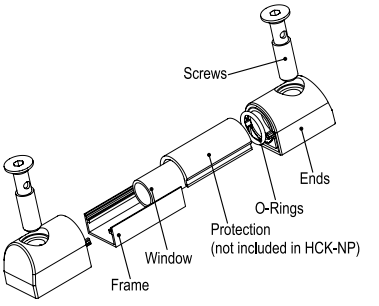
HCK.

ELESA Original design

Column level indicators with or without transparent protection

PA PC +100°C -30°C RoHS

- **Assembly ends**
  Glass-fibre reinforced polyamide based (PA) technopolymer, black colour.
- **Support**
  Aluminium in natural colour.
- **Column level window**
  Polycarbonate transparent tube.
  Maximum fluid level visibility even from side positions.
- **Screws, nuts and washers**
  Zinc-plated steel.
- **Packing rings**
  NBR rubber O-Ring.
- **Graduated contrast screen**
  Self-adhesive plastic material, resistant to oils, greases.
  Fitted to the aluminium support.
- **Standard executions**
  - **HCK**: with transparent front protection (against accidental shocks), in polycarbonate (PC), extractable for cleaning operations.
  - **HCK-NP**: without transparent front protection.
- **Maximum continuous working temperature**
  100°C (with oil).



Technical data

In laboratory tests carried out with mineral oil type CB68 (according to ISO 3498) at 23°C for a relatively limited time, the values of pression resistance were very high even higher than 35 bar. If you need to use the indicator with other oils or fluids and under different pressure and temperature conditions, please contact ELESA Technical Department. In any case we suggest to verify the suitability of the product under the actual working conditions..

Special executions on request

- Column level window in transparent methylmatacrylate (PMMA) for max 70°C use.
- AISI 303 stainless steel screws with hexagon socket.
- Polyamide based technopolymer float (from HCK.127) red colour.
- Expanded NBR float (from HCK.176) black colour with AISI 316 stainless steel spiral for special executions, viscous liquids, high temperatures.
- Column level window with visibility (l2) superior to 452 mm and holes centre distance for fixing up to 1.500 mm.
- Electric sensor bracket pre-set at the following temperatures: 50°C, 60°C, 70°C, 80°C.
- Packing rings in special material depending on the customer's needs.
- Built-in thermometer with red indication line.
- External scale thermometer (Fig. 1) with internal probe for fluid temperature.
- SLCK electric control level sensor (Fig.2, from HCK.127) which can be fitted along the axis of the indicator according to the actual needs. With right (DX) or left (SX) connectors, normally closed (NC), normally open (NO).
- Special screw with nickel-plated brass tap (Fig. 3) to be fitted to the lower assembly end for any maintenance operation requiring the indicator exclusion.

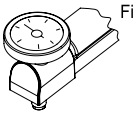


Fig.1

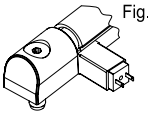


Fig.2

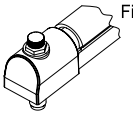
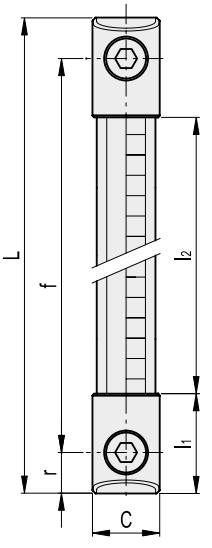
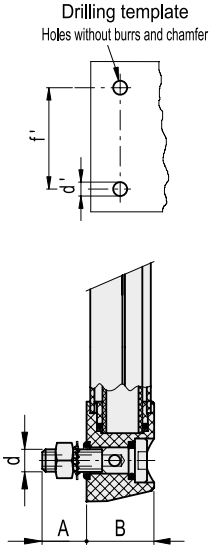


Fig.3





Standard Elements				Main dimensions									Mounting holes		C #	⚖
Code	Description	Code	Description	f	d	A	B	C	L	l1	l2	r	d '-0.2	f '±0.2	[Nm]	g
111001	HCK.76-M10	111001-NP	HCK.76-M10-NP	76	M10	20	33	33	113	35.5	42	18.5	10.5	76 ±0.2	12	183
111011	HCK.127-M12	111011-NP	HCK.127-M12-NP	127	M12	20	33	33	164	46.5	71	18.5	12.5	127±0.5	12	220
111021	HCK.176-M12	111021-NP	HCK.176-M12-NP	176	M12	20	33	33	213	46.5	120	18.5	12.5	176±0.5	12	250
111031	HCK.254-M12	111031-NP	HCK.254-M12-NP	254	M12	20	33	33	291	46.5	198	18.5	12.5	254±0.5	12	298
111041	HCK.381-M12	111041-NP	HCK.381-M12-NP	381	M12	20	33	33	418	46.5	325	18.5	12.5	381±0.5	12	377
111051	HCK.508-M12	111051-NP	HCK.508-M12-NP	508	M12	20	33	33	545	46.5	452	18.5	12.5	508±0.5	12	455

Maximum tightening torque.

HCK-GL

INOX Stainless Steel

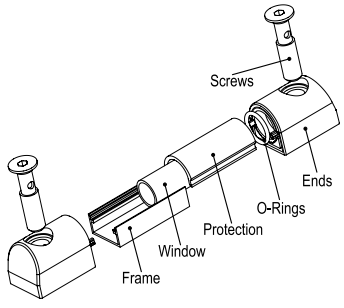
ELESA Original design

Column level indicators with transparent protection for glycol-based solutions

PA PC +100°C -30°C +130°C -30°C RoHS

- **Assembly ends**
  Glass-fibre reinforced polyamide based (PA) technopolymer, black colour.
- **Support**
  Aluminium in natural colour.
- **Column level window**
  Transparent tube in Pyrex, also suitable for use with glycol-based solutions. Maximum fluid level visibility even from side positions.
- **Transparent front protection** (against accidental shocks)
  Polycarbonate (PC), extractable for cleaning operations.
- **Screws, nuts and washers**
  - **HCK-GL**: screws with hexagon socket, zinc-plated steel nuts and washers.
  - **HCK-GL-SST**: AISI 303 stainless steel screws with exagonal socket, AISI 304 stainless steel nuts and washers.
- **Packing rings**
  - **HCK-GL**: rubber O-ring.
  - **HCK-GL-SST**: FKM type VITON®* synthetic rubber O-Ring.
- **Graduated contrast screen**
  Self-adhesive plastic material, resistant to oils, greases. Fitted to the aluminium support.
- **Maximum continuous working temperature**
  - **HCK-GL**: 100°C (with oil, water, glycol-based solutions).
  - **HCK-GL-SST**: 130°C (with oil, water, glycol-based solutions).

  In laboratory tests these indicators showed an excellent resistance to temperatures up to 150/160°C for many hours with pressures of 5/6 bar.



Technical data

In laboratory tests carried out with mineral oil type CB68 (according to ISO 3498) water or water/glycol-based solutions (50%), at 23°C for a relatively limited time, the values of pression resistance were very high even higher than 35 bar. If you need to use the indicator with other oils or fluids and under different pressure and temperature conditions, please contact ELESA Technical Department. In any case we suggest to verify the suitability of the product under the actual working conditions.

Special executions on request

- Polyamide based technopolymer float (from HCK.127) red colour.
- Expanded NBR float (from HCK.176) black colour with AISI 316 stainless steel spiral for special executions, viscous liquids, high temperatures.
- Column level window with visibility (l2) superior to 452 mm and holes centre distance (f) for fixing up to 1.500 mm.
- Electric sensor bracket pre-set at the following temperatures: 50°C, 60°C, 70°C, 80°C.
- Packing rings in special material depending on the customer's needs.
- Built-in thermometer with red indication line.
- External scale thermometer (Fig. 1) with internal probe for fluid temperature.
- SLCK electric control level sensor (Fig.2, from HCK.127) which can be fitted along the axis of the indicator according to the actual needs. With right (DX) or left (SX) connectors, normally closed (NC), normally open (NO).
- Special screw with nickel-plated brass tap (Fig. 3) to be fitted to the lower assembly end for any maintenance operation requiring the indicator exclusion.

** Registered trademark by DuPont Dow Elastomers*

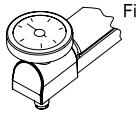


Fig.1

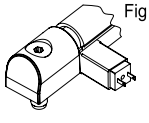


Fig.2

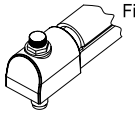
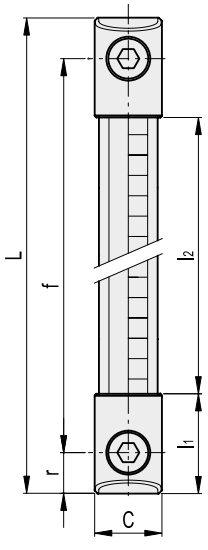
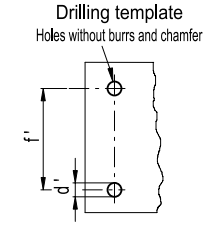
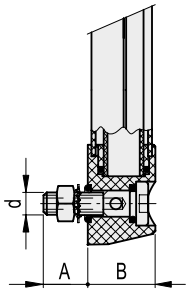


Fig.3







Standard Elements				Main dimensions									Mounting holes		C #	⚖
Code	Description	Code	Description	f	d	A	B	C	L	l1	l2	r	d '-0.2	f '±0.2	[Nm]	g
111004	HCK.76-GL-M10	111005	HCK.76-GL-SST-M10	76	M10	20	33	33	113	35.5	42	18.5	10.5	76	12	183
111014	HCK.127-GL-M12	111015	HCK.127-GL-SST-M12	127	M12	20	33	33	164	46.5	71	18.5	12.5	127	12	220
111024	HCK.176-GL-M12	111025	HCK.176-GL-SST-M12	176	M12	20	33	33	213	46.5	120	18.5	12.5	176	12	250
111034	HCK.254-GL-M12	111035	HCK.254-GL-SST-M12	254	M12	20	33	33	291	46.5	198	18.5	12.5	254	12	298
111044	HCK.381-GL-M12	111045	HCK.381-GL-SST-M12	381	M12	20	33	33	418	46.5	325	18.5	12.5	381	12	377
111054	HCK.508-GL-M12	111055	HCK.508-GL-SST-M12	508	M12	20	33	33	545	46.5	452	18.5	12.5	508	12	455

Maximum tightening torque.

SLCK

ELESA Original design

Kit for the electric control of a fluid level for HCK. and HCK-GL column level indicators

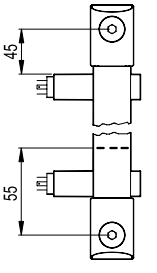
IP65 PA PP +80° -30° RoHS

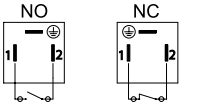
- **Sensor holder bracket**
  In polyamide based (PA) technopolymer, black colour, watertight, with a built-in relay (reed) with two conductors wired to the two-pin connector. It can be moved along the axis of the indicator and secured in the preferred position with the appropriate screw (set screw) in technopolymer.
- **Electric sensor**
  - NO: the electric circuit closes on reaching the preset level.
  - NC: the electric circuit opens on reaching the preset level.
- **Connector**
  With built-in cable gland and contact holders. Properly set, it offers an effective product protection against water sprays (IP 65 protection class according to IEC 529 table) that can be increased during installation with the necessary adjustments. NBR synthetic rubber packing rings.
- **Float**
  Polypropylene based (PP) technopolymer, black colour, with a built-in magnetic element to activate the electric contact when the float reaches the trigger threshold.
  The trigger threshold is determined by the user, by positioning the sensor holder along the axis of the indicator.
- **Spacers**
  In polyamide based (PA) technopolymer. Essential in cases where the reservoir is made out of ferromagnetic material in order to prevent the interaction between the magnet and the metal mass of the reservoir.
- **Kit**
  The kit includes one or two sensor holder brackets, a float, 4 O-rings (2 FKM for HCK-GL and 2 NBR for HCK) and two spacers.
  It is possible to apply more than one kit to get the electric control of different levels, consistently with the height of the transparent column.
- **Standard executions**
  - **SLCK-NO**: with electric contact normally open.
  - **SLCK-NC**: with electric contact normally closed.
  - **SLCK-NO-NC**: with one electric contact normally open and one electric contact normally closed.
  - **SLCK-NC-NC**: with two electric contacts normally closed.
  - **SLCK-NO-NO**: with two electric contacts normally open.
- **Maximum working temperature**
  80°C (with oil).

Features and performances

With the application of the SLCK kit, HCK. and HCK-GL column level indicators provide an electric signal when the fluid level reaches the level of preset intervention, besides the visual control of the level. The electric control of the level can be applied on all versions of HCK. from the version with 127 mm hole centre distance while always maintaining the visibility of fluid level even from side positions.
In the highest position, the sensor holder must be positioned at least 45 mm below the axis of the high screw (Fig.1), so that the switching takes place correctly.
In the lowest position, the fluid level which determines the switching of the electric circuit is of about 55 mm above the axis of the low screw of fluid supply (data referring to mineral oil type CB68, according to ISO 3498, temperature 23°C) (Fig. 1).
The sensor holder is arranged to be installed to the left with respect to the axis of the indicator. However, if required it can also be mounted on the right. The connector can be rotated by 90° in four positions when wiring.
For a correct assembly see Warnings page 99.

Fig.1





Level sensor electric characteristics	
Power supply	AC/DC
Electric contacts	NO normally open NC normally closed
Maximum applicable voltage	230 VDC / VAC
Max. opening capacity (CC CA)	2 A
Max. commutable power	40W / VA
Cable gland	Pg 7 (for cables in sheath with Ø6 or 7 mm)
Conductors max. cross-section	1.5 mm ^{2}

Do not mount this indicator in proximity to magnetic fields

Kit assembly instructions

- Remove the assembly end of the indicator (Fig. 2).
- Insert the sensor holder bracket (Fig. 3).
- Insert the float with the word "up" to the top and relocate the assembly end in place (Fig. 4).
- Clamp the bracket with the set screw to the desired position (Fig. 5).
- Install the indicator on the reservoir using the spacers included in the supply (necessary in case of reservoir made out of ferromagnetic material in order to avoid interaction between the magnet and the metal mass (Fig.6).
- Assemble the two-pin connector (Fig. 7).

Two-pin connectors assembly instructions

1. Remove the connector from the sensor holder bracket by unscrewing the axial set screw, take off the contact holder and unscrew the cable gland as required.
2. Slip on the cable into the connector and connect the wires to the terminals of the contact holder.
3. Assemble by pressing the contact holder into the connector (the contact holder can be rotated by 90° in four positions to have a different orientation of the connector).
4. Screw again the connector to the sensor holder by means of the axial set screw and then tighten the cable gland.

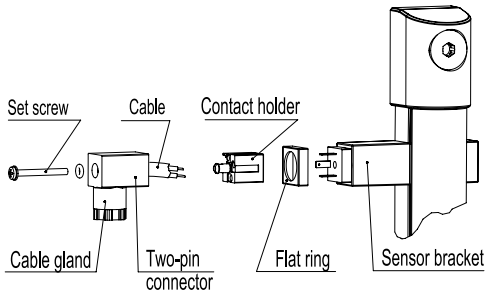
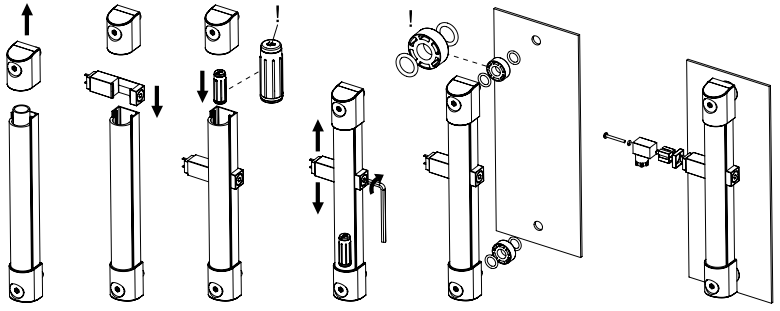
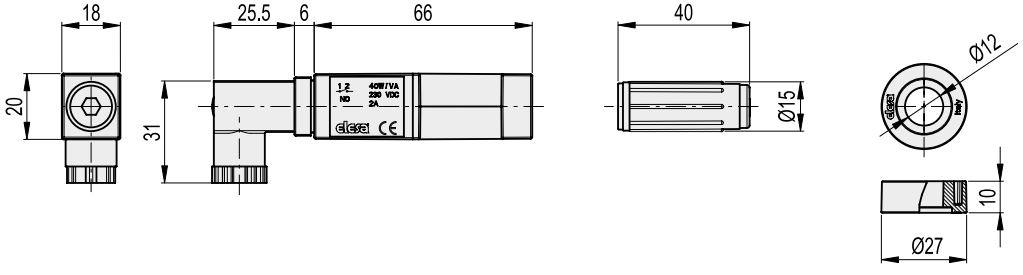


Fig.2 Fig.3 Fig.4 Fig.5 Fig.6 Fig.7



Sensor holder bracket **Float** **Spacers**



Standard Elements		⚖
Code	**Description**	**g**
110081	SLCK-NO	235
110083	SLCK-NC	235
110085	SLCK-NO-NC	235
110087	SLCK-NC-NC	235
110089	SLCK-NO-NO	235

HCL.

Column level indicators with U shaped protections

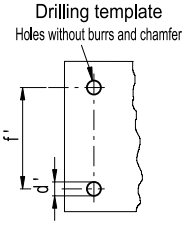
- **Material**
  Transparent tube with lenticular effect in acrylic material.
- **Protection**
  Aluminium in natural colour. It can be turned by 90°C where necessary.
- **Assembly ends**
  Glass-fibre reinforced polyamide based (PA) technopolymer, black colour.
- **Screws**
  Zinc-plated steel with hexagon socket.
- **Packing ring**
  NBR synthetic rubber O-Ring.
- **Graduated contrast screen**
  Plastic material, resistant to oils and greases. Fitted to the aluminium protection by means of an adhesive tape.
- **Maximum continuous working temperature**
  70°C (with oil or water).

Technical data

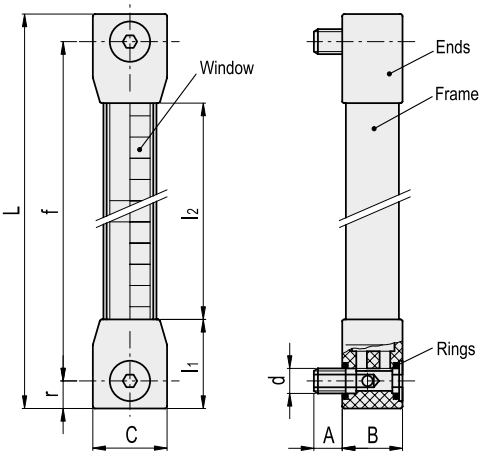
In laboratory tests carried out with mineral oil for hydraulic systems type CB68 (according to ISO 3498) with gradually increasing pressure, at 23°C, the weld stood up as follows:
- HCL.300 30 bar
- HCL.400 25 bar
- HCL.500 20 bar

In any case we suggest to verify the suitability of the product under the actual working conditions. If you need to use the indicator with other oils or fluids and under different pressure and temperature conditions, please contact ELESA Technical Department or carry out tests in order to guarantee a proper use.

Special executions on request *(For sufficient quantities)*
- Column level indicators with tubes and fixing endings in different materials to be used with special fluids and/or at high temperatures.
- AISI 316 stainless steel screws or nickel-plated brass.
- Polyamide based (PA) technopolymer float, red colour.
- Column level indicators with fitting centre-holes up to 2,000 mm.
- HCL/E column oil level indicators including float, minimum level signal, normally closed contacts (N.C.), normally open (N.A.) or change over.
- Variable position level sensors which can be placed along the axis of the indicator, with right (DX) or left (SX) connectors, normally closed (N.C.), normally open (N.A.) or change over contacts.
- Packing rings in FKM (VITON® type, registered trademark of DuPont Dow Elastomers) or in EPDM.



Drilling and installation data			
Description	**d'-0.2**	**f'±0.2**	**Maximum tightening torque [Nm]**
HCL-300	12.5	300	15
HCL-400	12.5	400	15
HCL-500	12.5	500	15



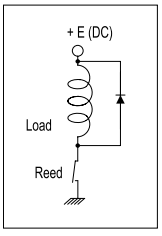
Standard Elements		Main dimensions									⚖
Code	**Description**	**f**	**d**	**A**	**B**	**C**	**L**	**l1**	**l2**	**r**	**g**
111211	HCL-300-M12	300	M12	13.5	28.5	35	326	42	242	13	227
111221	HCL-400-M12	400	M12	13.5	28.5	35	426	42	342	13	268
111231	HCL-500-M12	500	M12	13.5	28.5	35	526	42	442	13	306

The electric features of the Reed switches, shown in the descriptive tables, are supplied by the manufacturers. For a Reed switch connection, it is recommended to pay a special attention to the type of load to which the switch is going to be connected. For their nature inductive, capacitive or lamp loads, may produce surges during operation. These surges may damage the Reed switch or drastically reduce its operating life.

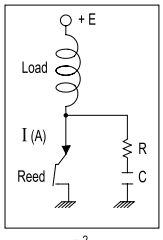
Inductive load

When a Reed switch is used to guide an inductive load such as engines and solenoid valves, the energy stored in the load may cause an inverse voltage when the Reed contact breaks. The voltage depends on the inductance value. The following circuits provide a protection in the cases hereunder mentioned.

In case of continuous voltage, it is enough to introduce a diode in parallel to the load respecting the polarity, to avoid any damage to the Reed switch.



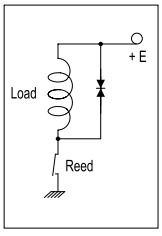
In case of alternating voltage, it is possible to use a resistance and a capacitance in parallel to the Reed switch. The values capacitance and resistance come out from the following formula.



$$C\,[\mu F] = \frac{I^2}{10}$$

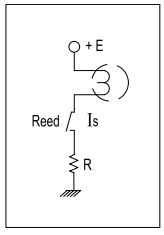
$$R\,[\Omega] = \frac{E}{10 \cdot I\,(1 + \frac{E}{50})}$$

An alternative solution may be to use a varistor in parallel to the load.

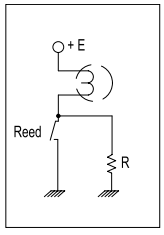


Lamp load

In case of a tungsten filament lamp, the filament resistance when the lamp is switched off (cold filament) is 10 times smaller than in case of the lamp switched on (hot filament).
After the Reed contact commutation, at after the lamp turning on, for a short time the in-rush current is 10 times higher than the one circulating in steady state. This flow may damage the Reed contact or jeopardize its duration.
In this case, the solution is to introduce a resistance in series to the Reed switch, this cutting the maximum value of the current, or a resistance in parallel to the Reed switch, to keep the filament hot (by increasing the resistance) without causing the lamp turning on.



R = Protection resistance
It must be properly chosen so that
Is < 0.5 A



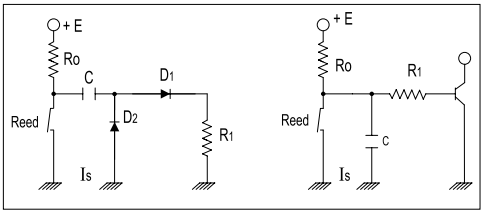
$$R < \frac{\text{Filament resistance}}{3}$$

Capacitive load

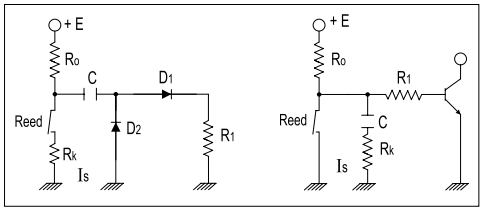
In case a capacitor is connected in series or in parallel with a Reed switch in a closed circuit, the in-rush current, which flows during charge and discharge of the capacitor, will cause deterioration of the Reed contacts. In this situation, the easiest and more effective solution is to position a resistance in series to the Reed switch or, in general, a resistance properly set in order to cut the maximum value of the currents of charge and discharge.

Here are two examples of circuit, in which the energy, stored in the capacitive load "C", generates rush currents discharging through the Reed contact. The use of a properly calibrated resistance reduces the value of these currents and protects the operating life of the Reed contact.

Circuit without protection



Circuit with protection

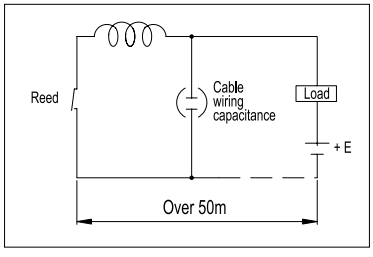


R_k is the resistance that limits the surges.
The value of R_k resistance depends on the circuit electric configuration.
As a general rule:

$$Is = \frac{V \text{ stored in the load}}{R_k\,[K\Omega]} < 0{,}1\ A$$

Wiring capacitance

In case a Reed switch is connected to a load by a cable, over a long distance, the static capacitance caused by the cable will affect the Reed switch.
Although it depends on the type of cable used, it is recommended that, in case the cable length exceeds 50 meters, protection is required for assuring a longer operating life of the Reed switch. In this situation an inductance in series to the Reed switch or a small resistance (current-limiting resistor of 10 to 500 ohms) can be inserted.



HCX-ST

ELESA Original design

Column level indicators with MAX temperature electrical sensor

PA-T +90° -30° IP65 RoHS

- **Material**
  Transparent polyamide based (PA-T) technopolymer. Highly resistant to shocks, solvents, oils with additives, aliphatic and aromatic hydrocarbons, petrol, naphtha, phosphoric esters. Avoid contact with alcohol or detergents containing alcohol.
- **Screw, nuts and washers**
  Zinc-plated steel.
- **Packing rings**
  NBR synthetic rubber O-Ring.
- **MAX temperature electrical sensor (80°C)**
  Zinc-plated screw with built-in sensor. Two executions available:
  - HCX+ST-N.A.: with electrical contact normally open.
  - HCX+ST-N.C.: with electrical contact normally closed.
  Pre-set temperature for both executions is 80°C.
- **Swivelling two-pin connector**
  With built-in cable gland and contact holder. Front or side output (right or left) including protection against water sprays (protection class IP 65 according to IEC 529 table) that can be increased during installation with the necessary adjustments. Flat NBR synthetic rubber packing rings.
- **Contrast screen**
  White lacquered aluminium. The housing, in the appropriate external rear slot, guarantees the best protection from direct contact with fluid, avoiding yellowing effect due to the prolonged action of the fluid at high temperatures. It can be removed before installation to fit marks and words (for example MAX-MIN).
- **Assembly**
  - When nuts can be fitted from the inside of the reservoir, by means of the supplied set screws and nuts.
  - When nuts cannot be fitted from the inside of the reservoir and the walls are thick enough, by means of the supplied set screws, without nuts, by tapping the two holes in the reservoir walls.
  - When nuts cannot be fitted from the inside of the reservoir and the walls are not thick enough, by means of the supplied set screws and the Fast Mounting Kit (see page 93) (for HCX.127).

  To ensure the best sealing of the O-rings it is recommended to apply the maximum torque on the nuts as reported in the table and a roughness of the gasket application surface Ra = 3 µm.
- **Maximum continuous working temperature**
  90°C (with oil).

Special executions on request

- Level indicators for use with fluids containing alcohol or with hot water.
- Temperature electrical sensor with pre-set temperatures different from 80°C.
- Indicators with two red ball-shaped floats.

Features and performances

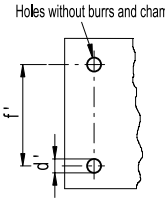
This column level indicator generates an electric signal when the temperature reaches the pre-set degrees (80°C).
Assembled using ultrasound welding to guarantee a perfect seal. Entirely in transparent material: maximum fluid level visibility even from side positions.

Technical data

In laboratory tests carried out with mineral oil for hydraulic systems type CB68 (according to ISO 3498) with gradually increasing pressure, at 23°C, the weld stood up as follows:
- HCX.127-ST 18 bar
- HCX.254-ST 12 bar

In any case we suggest to verify the suitability of the product under the actual working conditions. If you need to use the indicator with other oils or fluids and under different pressure and temperature conditions, please contact ELESA Technical Department or carry out tests in order to guarantee a proper use.

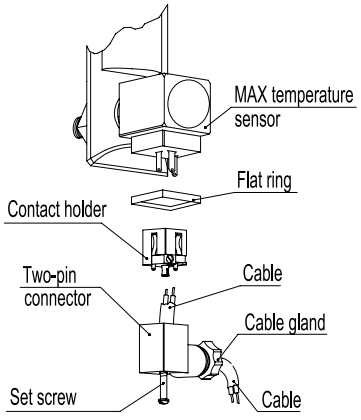
Drilling template
Holes without burrs and chamfer



Drilling and installation data			
Description	**d'-0.2**	**f'±0.2**	**Maximum tightening torque [Nm]**
HCX.127	12.5	127	12
HCX.254	12.5	254	10

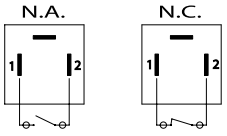
Two-pin connector assembly instructions

1. Remove the connector from the indicator by unscrewing the set screw placed in the bottom, take the contact holder out and loosen the cable gland.
2. Slip on the two-pole cable into the connector (standard connector) and connect the wires to the terminals nr. 1 and nr. 2 of the contact holder.
3. Assemble by pressing the contact holder into the connector in the required position.
4. Screw the connector to the indicator and then tighten the cable gland.

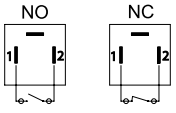


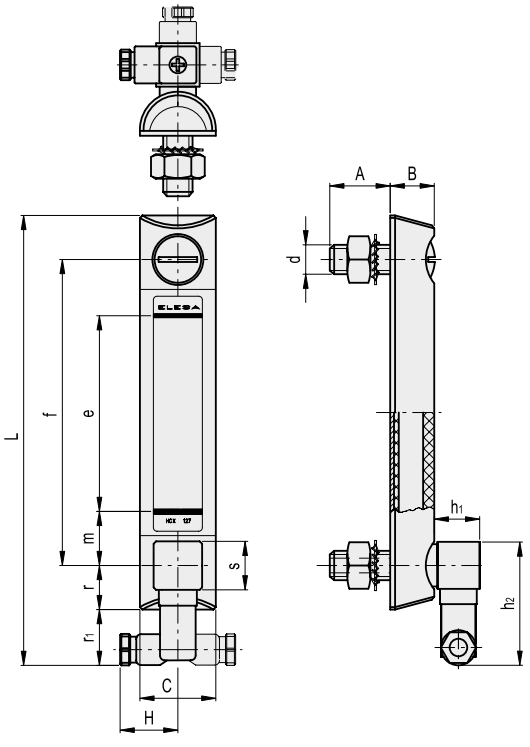
Functioning

- Execution HCX+ST-N.A. with electrical contacts normally open.
  Electrical temperature sensor: the electrical circuit is closed when the pre-set temperature at 80°C is reached.
- Execution HCX+ST-N.C. with electrical contacts normally closed.
  Electrical temperature sensor: the electrical circuit is open when the pre-set temperature at 80°C is reached.



Electric characteristics	MAX temperature sensor
Power supply	AC/DC
Electric contacts	NO normally open NC normally closed
Maximum applicable voltage/ opening capacity	250 Vac - 10 A 48 Vdc - 5 A (resisteve loads)
Cable gland	Pg 7 (for cables in sheath with Ø 6 o 7 mm)
Conductors cross-section	Max 1.5 mm ^{2}





Standard Elements		Main dimensions														⚖
Code	Description	f	d	A	B	C	H	L	e	m	r	r1	h1	h2	s	g
11161	HCX.127-ST-NO-M12	127	M12	23	18	31	27	187	80	23	17	26	21	54	22x22	220
11162	HCX.127-ST-NC-M12	127	M12	23	18	31	27	187	80	23	17	26	21	54	22x22	220
11171	HCX.254-ST-NO-M12	254	M12	21	18	35	27	315	203	26	18.5	24	21	54	22x22	265
11172	HCX.254-ST-NC-M12	254	M12	21	18	35	27	315	203	26	18.5	24	21	54	22x22	265

HCX-STL

ELESA Original design

Column level indicators with temperature electrical probe

PA-T | +90° -30° | IP65 | RoHS

- **Material**
  Transparent polyamide based (PA-T) technopolymer. Highly resistant to shocks, solvents, oils with additives, aliphatic and aromatic hydrocarbons, petrol, naphtha, phosphoric esters. Avoid contact with alcohol or detergents containing alcohol.
- **Screw, nuts and washers**
  Zinc-plated steel.
- **Packing rings**
  NBR synthetic rubber O-Ring.
- **Temperature electrical probe**
  Zinc-plated steel screw with built-in probe. The probe is made out of a platinum resistor whose ohmic resistance changes according to the temperature.
- **Swivelling two-pin connector**
  With built-in cable gland and contact holder. Front or side output (right or left) including protection against water sprays (protection class IP 65 according to IEC 529 table) that can be increased during installation with the necessary adjustments. Flat NBR synthetic rubber packing rings.
- **Contrast screen**
  White lacquered aluminium. The housing, in the appropriate external rear slot, guarantees the best protection from direct contact with fluid, avoiding yellowing effect due to the prolonged action of the fluid at high temperatures. It can be removed before installation to fit marks and words (for example MAX-MIN).
- **Assembly**
  - When nuts can be fitted from the inside of the reservoir, by means of the supplied set screws and nuts.
  - When nuts cannot be fitted from the inside of the reservoir and the walls are thick enough, by means of the supplied set screws, without nuts, by tapping the two holes in the reservoir walls.
  - When nuts cannot be fitted from the inside of the reservoir and the walls are not thick enough, by means of the supplied set screws and the Fast Mounting Kit (see page 93) (for HCX.127).

  To ensure the best sealing of the O-rings it is recommended to apply the maximum torque on the nuts as reported in the table and a roughness of the gasket application surface Ra = 3 µm.
- **Maximum continuous working temperature**
  90°C (with oil).

Special executions on request

- Level indicators for use with fluids containing alcohol or with hot water.
- Indicators with two red ball-shaped floats.

Features and performances

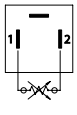
This column level indicator generates an analogic electric signal of the oil temperature.
Assembled using ultrasound welding to guarantee a perfect seal. Entirely in transparent material: maximum fluid level visibility even from side positions.

Technical data

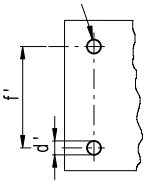
In laboratory tests carried out with mineral oil for hydraulic systems type CB68 (according to ISO 3498) with gradually increasing pressure, at 23°C, the weld stood up as follows:
- HCX.127-STL 18 bar
- HCX.254-STL 12 bar

In any case we suggest to verify the suitability of the product under the actual working conditions. If you need to use the indicator with other oils or fluids and under different pressure and temperature conditions, please contact ELESA Technical Department or carry out tests in order to guarantee a proper use.

Electric characteristics	Temperature probe
Power supply	DC
Maximum applicable voltage	2 mA
Cable gland	Pg 7 (for cables in sheath with Ø 6 o 7 mm)
Conductors cross-section	Max 1.5 mm 2



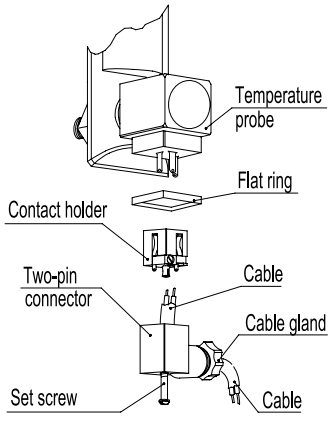
Drilling template
Holes without burrs and chamfer



Drilling and installation data			
Description	**d'-0.2**	**f'±0.2**	**Maximum tightening torque [Nm]**
HCX.127	12.5	127	12
HCX.254	12.5	254	10

Two-pin connector assembly instructions

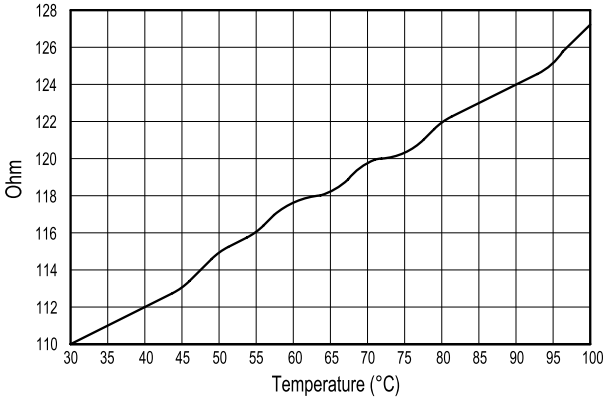
1. Remove the connector from the indicator by unscrewing the set screw placed in the bottom, take the contact holder out and loosen the cable gland.
2. Slip on the two-pole cable into the connector (standard connector) and connect the wires to the terminals nr. 1 and nr. 2 of the contact holder.
3. Assemble by pressing the contact holder into the connector in the required position.
4. Screw the connector to the indicator and then tighten the cable gland.

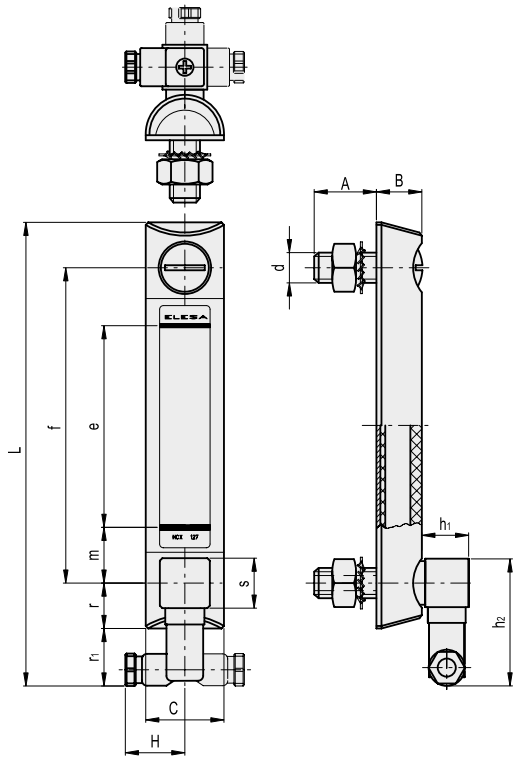


Functioning of the temperature electrical probe

The working principle of the temperature probe is to measure the variation of resistance of a platinum element: 100 ohm = 0°C, 138.4 ohm = 100°C.
The function between temperature (T) and resistance (R) is approximately linear over a small temperature range: for example, if you assume that it is linear over the 0° to 100°C range, the error at 50°C is 0.4°C. For precision measurement, it is necessary to linearise the resistance to give an accurate temperature. The most recent definition of the function between resistance and temperature is International Temperature Standard 90 (ITS-90). The function between resistance and temperature, obtained in laboratory tests, measuring directly the resistance value on the contacts is shown in the graph.
We suggest, anyway, to set the system in order to compensate both heat dissipation and cable resistance.
A 1°C temperature change will cause a 0.384 ohm change in resistance, so even a small error in measurement of the resistance (for example, the resistance of the wires leading to the sensor) can cause a large error in the measurement of the temperature.
Because of the low signal levels, it is important to keep any cables away from electric cables, motors, switchgear and other devices that may emit electrical noise. Using screened cable, with the screen grounded at one end, may help to reduce interference. When using long cables, it is necessary to check that the measuring equipment is able to handle the cable resistance.

Resistance / temperature conversion graph





Standard Elements		Main dimensions														⚖
Code	Description	f	d	A	B	C	H	L	e	m	r	r1	h1	h2	s	g
11166	HCX.127-STL-M12	127	M12	23	18	31	27	187	80	23	17	26	21	54	22x22	220
11176	HCX.254-STL-M12	254	M12	21	18	35	27	315	203	26	18.5	24	21	54	22x22	265

HCX-E

ELESA Original design

Column level indicators with MIN level electrical sensor

PA-T | PA | +90° -30° | IP65 | RoHS

- **Material**
  Transparent polyamide based (PA-T) technopolymer. Highly resistant to shocks, solvents, oils with additives, aliphatic and aromatic hydrocarbons, petrol, naphtha, phosphoric esters. Avoid contact with alcohol or detergents containing alcohol.
- **Screws, nuts and washers**
  Zinc-plated steel.
- **Packing rings**
  NBR synthetic rubber O-Ring.
- **Float**
  Polyamide based (PA) expanded technopolymer, black colour, with a built-in magnetic element to activate the electric contact when the oil level drops to a minimum; alarm threshold located at about 50 mm from the centre of the lower nut (in presence of mineral oil type CB68, according to ISO 3498, at 23°C).
- **Sensor bracket**
  Watertight in polypropylene based (PP) technopolymer, black colour, with a built-in relay (reed) with two conductors wired to the two-pin connector.
  For a correct assembly see Warnings (page 99).
- **Swivelling two-pin connector**
  With built-in cable gland and contact holder. Front or side output (right or left) including protection against water sprays (protection class IP 65 according to IEC 529 table that can be increased during installation with the necessary adjustments. Flat NBR synthetic rubber packing rings.
- **Contrast screen**
  White lacquered aluminium. The housing, in the appropriate external rear slot, guarantees the best protection from direct contact with fluid, avoiding yellowing effect due to the prolonged action of the fluid at high temperatures. It can be removed before installation to fit marks and words (for example MAX-MIN), in the needed positions.
- **Standard executions**
  - **HCX-E-NO**: with electrical contact normally open.
  - **HCX-E-NC**: with electrical contact normally closed.
- **Assembly**
  - By means of the supplied set screws and nuts.
  - By means of the supplied set screws, without nuts, by tapping the two holes in the reservoir walls, if they are thick enough.
  - By means of the supplied set screws and the Fast Mounting Kit (page 93) when nuts cannot be fitted from the inside of the reservoir and the walls are not thick enough.

  To ensure the best sealing of the O-rings it is recommended to apply the maximum torque on the nuts as reported in the table and a roughness of the gasket application surface Ra = 3 µm.
- **Maximum continuous working temperature**
  90°C (with oil).

Special executions on request

- Level indicators for use with fluids containing alcohol.
- UV resistant transparent technopolymer indicators.

Features and performances

The column level indicator HCX-E, in addition to the visual control, generates an electric signal when the oil level drops to a minimum.
The body of the indicator, entirely in transparent material, is assembled using ultrasound welding to guarantee a perfect seal.
Maximum fluid level visibility even from side positions.
Level visibility magnified by lens effect.

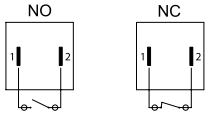
Technical data

In laboratory tests carried out with mineral oil type CB68 (according to ISO 3498) at 23°C for a limited period of time, the weld stood up to 13 bar.
If you need to use the indicator with other oils or fluids and under different pressure and temperature conditions, please contact ELESA Technical Department.
In any case we suggest to verify the suitability of the product under the actual working conditions.

Functioning of the MIN level electrical sensor

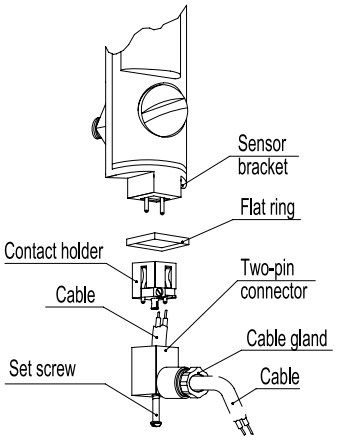
- HCX-E-NO: the electrical circuit is closed when the minimum level is reached.
- HCX-E-NC: the electrical circuit is open when the minimum level is reached.

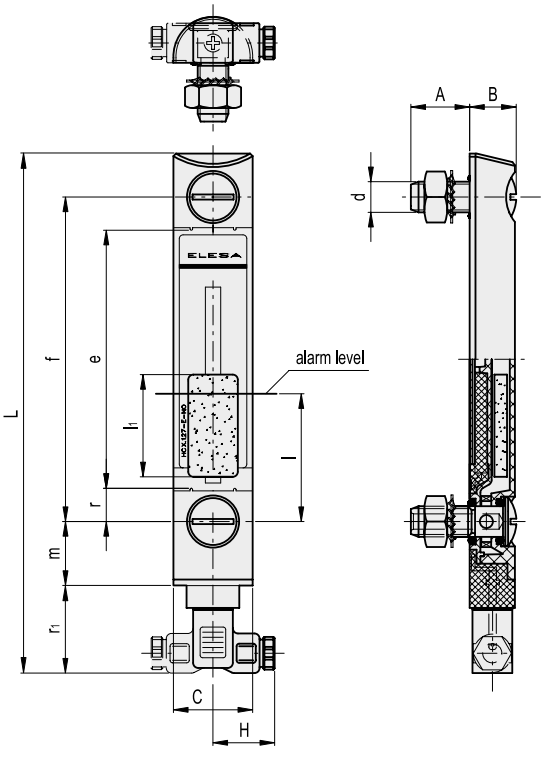
Electric characteristics	MIN level sensor
Power supply	AC/DC
Electric contacts	NO normally open NC normally closed
Maximum applicable voltage	NO: 150 Vac, 100 Vdc NC: 150 Vac, 150 Vdc
Maximum commutable opening capacity	1 A
Maximum bearable opening capacity	NO: 1A NC: 2A
Maximum commutable power	NO: 10 Va NC: 20 Va
Cable gland	Pg 7 (for cables in sheath with Ø 6 o 7 mm)
Conductors cross-section	Max 1.5 mm^2
Do not mount this indicator in proximity to magnetic fields.	

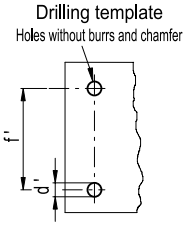


Two-pin connector assembly instructions

1. Remove the connector from the indicator by unscrewing the set screw placed in the bottom, take the contact holder out and loosen the cable gland.
2. Slip on the two-pole cable into the connector (standard connector) and connect the wires to the terminals nr. 1 and nr. 2 of the contact holder.
3. Assemble by pressing the contact holder into the connector in the required position.
4. Screw the connector to the indicator and then tighten the cable gland.







Standard Elements		Main dimensions													Mounting holes		C #	⚖
Code	Description	f	d	A	B	C	H	L	e	l	l1	m	r	r1	d'-0.2	f'±0.2	[Nm]	g
11141	HCX.127-E-NO-M12	127	M12	23	20	32	26	202	101	50	40	25	13	32.5	12.5	127	12	150
11142	HCX.127-E-NC-M12	127	M12	23	20	32	26	202	101	50	40	25	13	32.5	12.5	127	12	150
11145	HCX.254-E-NO-M12	254	M12	23	20	31	25	328	228	50	40	25	13	32.5	12.5	254	12	177
11146	HCX.254-E-NC-M12	254	M12	23	20	31	25	328	228	50	40	25	13	32.5	12.5	254	12	177

Maximum tightening torque.

HCX-E-ST

ELESA Original design

Column level indicators with MIN level and MAX temperature electrical sensors

PA-T | PA | +90° -30° | IP65 | RoHS

- **Material**
  Transparent polyamide based (PA-T) technopolymer. Highly resistant to shocks, solvents, oils with additives, aliphatic and aromatic hydrocarbons, petrol, naphtha, phosphoric esters.
  Avoid contact with alcohol or detergents containing alcohol.
- **Screw, nuts and washers**
  Zinc-plated steel.
- **Packing rings**
  NBR synthetic rubber O-Ring.
- **Float**
  Polyamide based (PA) expanded technopolymer, black colour, with a built-in magnetic element to activate the electric contact when the oil level drops to a minimum; alarm threshold located at about 50 mm from the centre of the lower nut (in presence of mineral oil type CB68, according to ISO 3498, at 23°C).
- **Sensor bracket**
  Watertight in polypropylene based (PP) technopolymer, black colour, with a built-in relay (reed) with two conductors wired to the two-pin connector.
  For a correct assembly see Warnings (page 99).
- **MAX temperature electrical sensor (80°C)**
  Zinc-plated screw with built-in sensor.
  Temperature of intervention is 80°C.
- **Swivelling two-pin connectors**
  With built-in cable glands and contact holders. Front or side output (right or left) including protection against water sprays (protection class IP 65 according to IEC 529 table) that can be increased during installation with the necessary adjustments. Flat NBR synthetic rubber packing rings.
- **Contrast screen**
  White lacquered aluminium. The housing, in the appropriate external rear slot, guarantees the best protection from direct contact with fluid, avoiding yellowing effect due to the prolonged action of the fluid at high temperatures. It can be removed before installation to fit marks and words (for example MAX-MIN).
- **Standard executions**
  - **HCX-E-ST-NO**: with electrical contact normally open.
  - **HCX-E-ST-NC**: with electrical contact normally closed.
- **Assembly**
  - By means of the supplied set screws and nuts.
  - By means of the supplied set screws, without nuts, by tapping the two holes in the reservoir walls, if they are thick enough.
  - By means of the supplied set screws and the Fast Mounting Kit (page 93) when nuts cannot be fitted from the inside of the reservoir and the walls are not thick enough.

  To ensure the best sealing of the O-rings it is recommended to apply the maximum torque on the nuts as reported in the table and a roughness of the gasket application surface Ra = 3 µm.
- **Maximum continuous working temperature**
  90°C (with oil).

Special executions on request

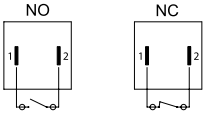
- Level indicators for use with fluids containing alcohol.
- UV resistant transparent technopolymer indicators.
- Temperature electrical sensor with pre-set temperatures different from 80°C.

Features and performances

This column level indicator generates two electric signals: one when the oil goes down to the minimum level allowed and the other one when the temperature reaches the pre-set degrees (80°C).

Technical data

In laboratory tests carried out with mineral oil type CB68 (according to ISO 3498) at 23°C for a limited period of time, the weld stood up to 13 bar.
If you need to use the indicator with other oils or fluids and under different pressure and temperature conditions, please contact ELESA Technical Department. In any case we suggest to verify the suitability of the product under the actual working conditions.



Electric characteristics	MIN level sensor
Power supply	AC/DC
Electric contacts	NO normally open NC normally closed
Maximum applicable voltage	NO: 150 Vac, 100 Vdc NC: 150 Vac, 150 Vdc
Maximum commutable opening capacity	1 A
Maximum bearable opening capacity	NO: 1A NC: 2A
Maximum commutable power	NO: 10 Va NC: 20 Va
Cable gland	Pg 7 (for cables in sheath with Ø 6 o 7 mm)
Conductors cross-section	Max 1.5 mm ^{2}

Electric characteristics	MAX temperature sensor
Power supply	AC/DC
Electric contacts	NO normally open NC normally closed
Maximum applicable voltage/ opening capacity	250 Vac - 10 A 48 Vdc - 5 A (resisteve loads)
Cable gland	Pg 7 (for cables in sheath with Ø 6 o 7 mm)
Conductors cross-section	Max 1.5 mm ^{2}

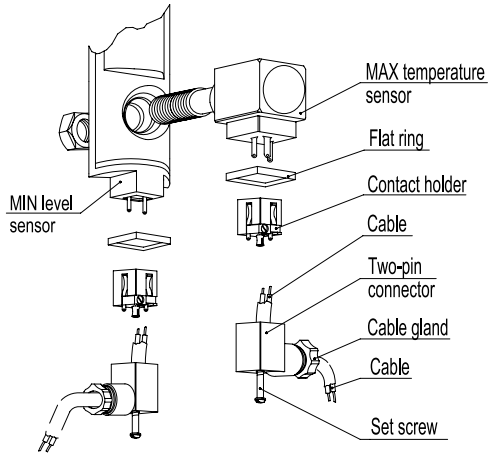
Do not mount this indicator in proximity to magnetic fields.

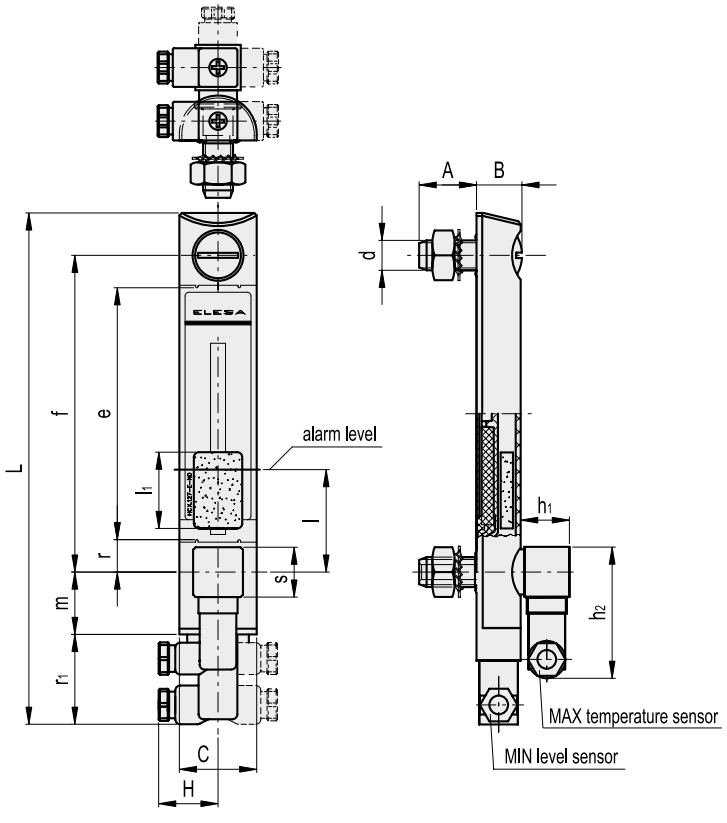
Functioning of the electrical sensors

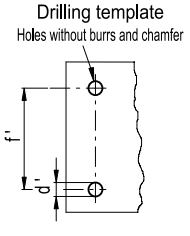
- HCX-E-ST-NO with electrical contacts normally open.
  MIN level electrical sensor: the electrical circuit is closed when the minimum level is reached.
  MAX temperature electrical sensor: the electrical circuit is closed when the pre-set temperature at 80°C is reached.
- HCX-E-ST-NC with electrical contacts normally closed. MIN level electrical sensor: the electrical circuit is open when the minimum level is reached.
  MAX temperature electrical sensor: the electrical circuit is open when the pre-set temperature at 80°C is reached.

Two-pin connectors assembly instructions

1. Remove the connectors from the indicator by unscrewing the set screw placed in the bottom, take the contact holders out and loosen the cable glands.
2. Slip on the two-pole cable into the connectors (standard connectors) and connect the wires to the terminals nr. 1 and nr. 2 of the relative contact holders.
3. Assemble by pressing the contact holders into the realtive connectors in the required position.
4. Screw the connectors to the indicator and then tighten the cable glands.







Standard Elements		Main dimensions																Mounting holes		C #	⚖
Code	Description	f	d	A	B	C	H	L	e	l	l1	m	r	r1	h1	h2	s	d'-0.2	f'±0.2	[Nm]	g
11151	HCX.127-E-ST-NO-M12	127	M12	23	20	31.5	25	202	101	50	40	25	13	32.5	21	54	22x22	12.5	127	12	235
11152	HCX.127-E-ST-NC-M12	127	M12	23	20	31.5	25	202	101	50	40	25	13	32.5	21	54	22x22	12.5	127	12	235
11153	HCX.254-E-ST-NO-M12	254	M12	23	20	31	25	328	228	50	40	25	13	32.5	21	54	22x22	12.5	254	12	262
11154	HCX.254-E-ST-NC-M12	254	M12	23	20	31	25	328	228	50	40	25	13	32.5	21	54	22x22	12.5	254	12	262

Maximum tightening torque.

HCX-E-STL

ELESA Original design

Column level indicators with MIN level electrical sensor and temperature electrical probe

PA-T PA +90° -30° IP65 RoHS

- **Material**
  Transparent polyamide based (PA-T) technopolymer. Highly resistant to shocks, solvents, oils with additives, aliphatic and aromatic hydrocarbons, petrol, naphtha, phosphoric esters. Avoid contact with alcohol or detergents containing alcohol.
- **Screw, nuts and washers**
  Zinc-plated steel.
- **Packing rings**
  NBR synthetic rubber O-Ring.
- **Float**
  Polyamide based (PA) expanded technopolymer, black colour, with a built-in magnetic element to activate the electric contact when the oil level drops to a minimum; alarm threshold located at about 50 mm from the centre of the lower nut (in presence of mineral oil type CB68, according to ISO 3498, at 23°C).
- **Sensor bracket**
  Watertight in polypropylene based (PP) technopolymer, black colour, with a built-in relay (reed) with two conductors wired to the two-pin connector.
  For a correct assembly see Warnings (page 99).
- **Temperature electrical probe**
  Zinc-plated steel screw with built-in probe. The probe is made out of a platinum resistor whose ohmic resistance changes according to the temperature.
- **Swivelling two-pin connectors**
  With built-in cable glands and contact holders. Front or side output (right or left) including protection against water sprays (protection class IP 65 according to IEC 529 table) that can be increased during installation with the necessary adjustments. Flat NBR synthetic rubber packing rings.
- **Contrast screen**
  White lacquered aluminium. The housing, in the appropriate external rear slot, guarantees the best protection from direct contact with fluid, avoiding yellowing effect due to the prolonged action of the fluid at high temperatures. It can be removed before installation to fit marks and words (for example MAX-MIN).
- **Standard executions**
  - **HCX-E-STL-NO**: with electrical contact normally open.
  - **HCX-E-STL-NC**: with electrical contact normally closed.
- **Assembly**
  - By means of the supplied set screws and nuts.
  - By means of the supplied set screws, without nuts, by tapping the two holes in the reservoir walls, if they are thick enough.
  - By means of the supplied set screws and the Fast Mounting Kit (page 93) when nuts cannot be fitted from the inside of the reservoir and the walls are not thick enough.

  To ensure the best sealing of the O-rings it is recommended to apply the maximum torque on the nuts as reported in the table and a roughness of the gasket application surface Ra = 3 µm.
- **Maximum continuous working temperature**
  90°C (with oil).

Special executions on request

UV resistant transparent technopolymer indicators.

Features and performances

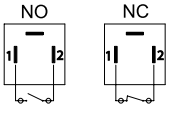
This column level indicator generates an electric signal when the oil goes down to the minimum level allowed and an analogic electric signal of the oil temperature.

Technical data

In laboratory tests carried out with mineral oil type CB68 (according to ISO 3498) at 23°C for a limited period of time, the weld stood up to 13 bar.
If you need to use the indicator with other oils or fluids and under different pressure and temperature conditions, please contact ELESA Technical Department. In any case we suggest to verify the suitability of the product under the actual working conditions.

Functioning of the MIN level electrical sensor

- HCX-E-STL-NO: the electrical circuit is closed when the minimum level is reached.
- HCX-E-STL-NC: the electrical circuit is open when the minimum level is reached.



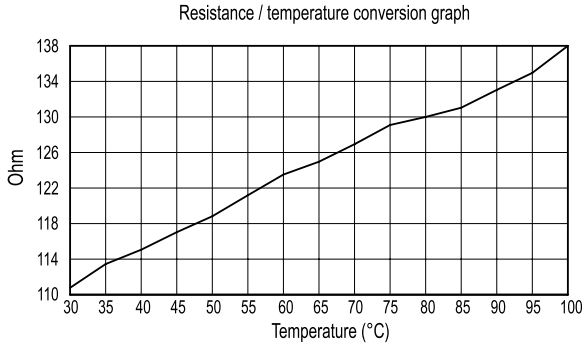
Electric characteristics	MIN level sensor
Power supply	AC/DC
Electric contacts	NO normally open NC normally closed
Maximum applicable voltage	NO: 150 Vac, 100 Vdc NC: 150 Vac, 150 Vdc
Maximum commutable opening capacity	1 A
Maximum bearable opening capacity	NO: 1A NC: 2A
Maximum commutable power	NO: 10 Va NC: 20 Va
Cable gland	Pg 7 (for cables in sheath with Ø 6 o 7 mm)
Conductors cross-section	Max 1.5 mm ^{2}
Do not mount this indicator in proximity to magnetic fields.	

Electric characteristics	Temperature probe
Power supply	DC
Maximum applicable voltage	2 mA
Cable gland	Pg 7 (for cables in sheath with Ø 6 o 7 mm)
Conductors cross-section	Max 1.5 mm^2

Functioning of the temperature electrical probe

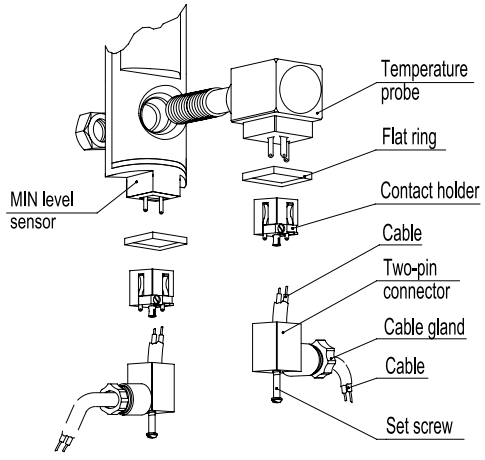
The working principle of the temperature probe is to measure the variation of resistance of a platinum element: 100 ohm = 0°C, 138.4 ohm = 100°C.
The function between temperature (T) and resistance (R) is approximately linear over a small temperature range: for example, if you assume that it is linear over the 0° to 100°C range, the error at 50°C is 0.4°C. For precision measurement, it is necessary to linearise the resistance to give an accurate temperature. The most recent definition of the function between resistance and temperature is International Temperature Standard 90 (ITS-90). The function between resistance and temperature, obtained in laboratory tests, measuring directly the resistance value on the contacts is shown in the graph.
We suggest, anyway, to set the system in order to compensate both heat dissipation and cable resistance.

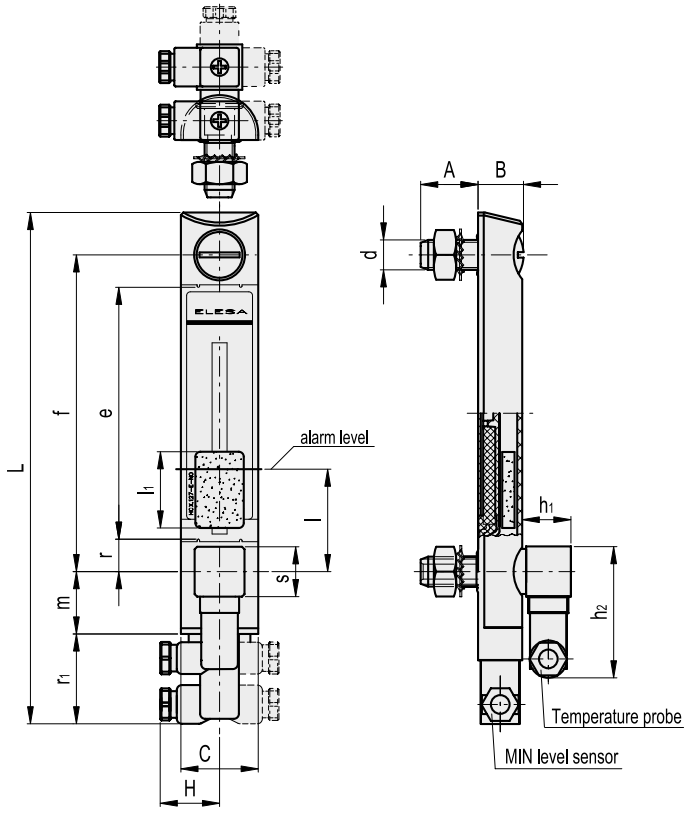
A 1°C temperature change will cause a 0.384 ohm change in resistance, so even a small error in measurement of the resistance (for example, the resistance of the wires leading to the sensor) can cause a large error in the measurement of the temperature.
Because of the low signal levels, it is important to keep any cables away from electric cables, motors, switchgear and other devices that may emit magnetic or electrical noise. Using screened cable, with the screen grounded at one end, may help to reduce interference. When using long cables, it is necessary to check that the measuring equipment is able to handle the cable resistance.

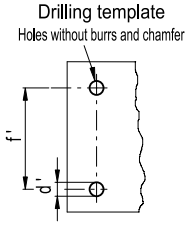


Two-pin connectors assembly instructions

1. Remove the connectors from the indicator by unscrewing the set screw placed in the bottom, take the contact holders out and loosen the cable glands.
2. Slip on the two-pole cable into the connectors (standard connectors) and connect the wires to the terminals nr. 1 and nr. 2 of the relative contact holders.
3. Assemble by pressing the contact holders into the realtive connectors in the required position.
4. Screw the connectors to the indicator and then tighten the cable glands.







Standard Elements		Main dimensions																Mounting holes		C #	⚖
Code	Description	f	d	A	B	C	H	L	e	l	l1	m	r	r1	h1	h2	s	d'-0.2	f'±0.2	[Nm]	g
11156	HCX.127-E-STL-NO-M12	127	M12	23	20	31.5	25	202	101	50	40	25	13	32.5	21	54	22x22	12.5	127	12	236
11157	HCX.127-E-STL-NC-M12	127	M12	23	20	31.5	25	202	101	50	40	25	13	32.5	21	54	22x22	12.5	127	12	236
11158	HCX.254-E-STL-NO-M12	254	M12	23	20	31	25	328	228	50	40	25	13	32.5	21	54	22x22	12.5	254	12	263
11159	HCX.254-E-STL-NC-M12	254	M12	23	20	31	25	328	228	50	40	25	13	32.5	21	54	22x22	12.5	254	12	263

Maximum tightening torque.

HCY-E

Column level indicators with MIN level electrical sensor

PA-T | +80° -20° | IP65 | RoHS

- **Material**
  Transparent polyamide based (PA-T) technopolymer. Highly resistant to shocks, solvents, oils with additives, aliphatic and aromatic hydrocarbons, petrol, naphtha, phosphoric esters.
  Avoid contact with alcohol or detergents containing alcohol.
- **Screws**
  Nickel-plated brass with hexagon socket.
- **Packing rings**
  NBR synthetic rubber O-Ring.
- **Float**
  Polyamide based (PA) technopolymer, red colour, with a built-in magnetic element to activate the electric contact when the oil level drops to a minimum, set at 40mm over the screw axis (dimension l).
- **Sensor bracket**
  Watertight, black colour, with a built-in relay (reed).
  Two executions available:
  - with electrical contact normally open HCY/E-N.A.
  - with electrical contact normally closed HCY/E-N.C.
- **Connector**
  Right side output including protection against water sprays (protection class IP 65 according to IEC 529 table).
- **Contrast screen**
  Aluminium. The housing, in the appropriate external rear slot, guarantees the best protection from direct contact with fluid, avoiding yellowing effect due to the prolonged action of the fluid at high temperatures.
- **Maximum continuous working temperature**
  80°C (with oil).

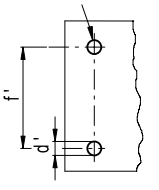
Technical data

In laboratory tests carried out with mineral oil for hydraulic systems type CB68 (according to ISO 3498) with gradually increasing pressure, at 23°C, the weld stood up as follows:
- HCY.76 14 bar
- HCY.127 9 bar
- HCY.254 8 bar

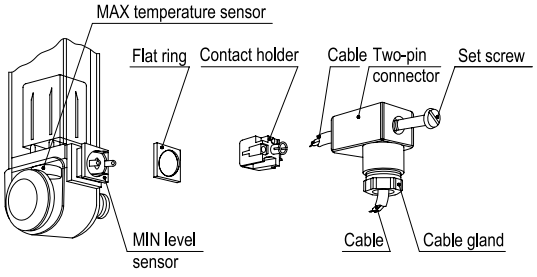
In any case we suggest to verify the suitability of the product under the actual working conditions. If you need to use the indicator with other oils or fluids and under different pressure and temperature conditions, please contact ELESA Technical Department or carry out tests in order to guarantee a proper use.

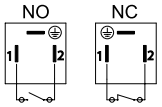
Special executions on request *(For sufficient quantities)*
- Column level indicators in different materials (POLYCARBONATE), for use with special fluids and/or at high temperatures.
- AISI 316 stainless steel or nickel-plated brass screws.
- Column level indicators with change-over electrical contact.

Drilling template
Holes without burrs and chamfer

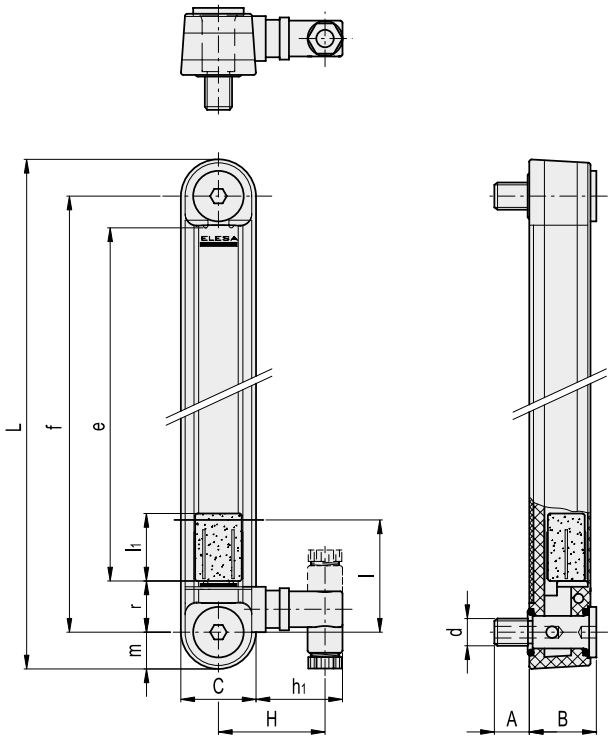


Drilling and installation data			
Description	**d'-0.2**	**f'±0.2**	**Maximum tightening torque [Nm]**
HCY.76	10.5	76	12
HCY.127	12.5	127	12
HCY.254	12.5	254	10





Electric characteristics	MIN level sensor
Power supply	AC/DC
Electric contacts	NO normally open NC normally closed
Maximum applicable voltage	NO: 150 Vac, 150 Vdc NC: 230 Vac, 230 Vdc
Maximum commutable opening capacity	NO: 1A NC: 2A
Maximum commutable power	NO: 20 W /20 V.A. NC: 40 W / 40 V.A.
Cable gland	Pg 7 (for cables in sheath with Ø 6 o 7 mm)
Conductors cross-section	Max 1.5 mm^2
Do not mount this indicator in proximity to magnetic fields.	



Standard Elements		Main dimensions													⚖
Code	Description	f	d	A	B	C	H	h1	L	e	l	l1	m	r	g
111101	HCY.76-E-NO-M10	76	M10	15	29	32	46	37	108	41	40	17	16	20	150
111102	HCY.76-E-NC-M10	76	M10	15	29	32	46	37	108	41	40	17	16	20	150
111111	HCY.127-E-NO-M12	127	M12	15	29	32	46	37	159	93	40	29	16	20	170
111112	HCY.127-E-NC-M12	127	M12	15	29	32	46	37	159	93	40	29	16	20	170
111121	HCY.254-E-NO-M12	254	M12	15	29	32	46	37	286	219	40	29	16	20	215
111122	HCY.254-E-NC-M12	254	M12	15	29	32	46	37	286	219	40	29	16	20	215

HCY-E-ST

Column level indicators with MIN level and MAX temperature electrical sensors

PA-T | +80° -20° | IP65 | RoHS

- **Material**
  Transparent polyamide based (PA-T) technopolymer. Highly resistant to shocks, solvents, oils with additives, aliphatic and aromatic hydrocarbons, petrol, naphtha, phosphoric esters.
  Avoid contact with alcohol or detergents containing alcohol.
- **Screws**
  Nickel-plated brass with hexagon socket.
- **Packing ring**
  NBR synthetic rubber O-Ring.
- **Float**
  Polyamide based (PA) technopolymer, red colour, with a built-in magnetic element to activate the electric contact when the oil level drops to a minimum, set at 40mm over the screw axis (dimension l).
- **MIN level electrical sensor**
  With electrical contacts normally open (N.A.) or normally closed (N.C.), it generates an electric signal when the oil level reaches the minimum level.
  The inside of the cavity where the sensor is contained is completely resinated in order to increase the insulation.
- **Connector**
  Right side output including protection against water sprays (protection class IP 65 according to IEC 529 table.
- **MAX temperature electrical sensor (80°)**
  With electrical contact normally open (N.A.) or normally closed (N.C.), it is set at a standard intervention temperature of 80°C, next to a metallic plate which serves as a conductor of the heat of the fluid for a faster transmission and a lower dissipation. The inside of the cavity where the sensor is contained is completely resinated in order to increase the insulation.
- **Contrast screen**
  Aluminium. The housing, in the appropriate external rear slot, guarantees the best protection from direct contact with fluid, avoiding yellowing effect due to the prolonged action of the fluid at high temperatures.
- **Maximum continuous working temperature**
  80°C (with oil).
- **Screw-covers**
  Polyamide based technopolymer, grey colour.

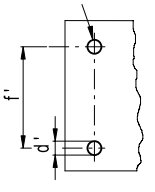
Technical data

In laboratory tests carried out with mineral oil for hydraulic systems type CB68 (according to ISO 3498) with gradually increasing pressure, at 23°C, the weld stood up as follows:
- HCY.76 14 bar
- HCY.127 9 bar
- HCY.254 8 bar

In any case we suggest to verify the suitability of the product under the actual working conditions. If you need to use the indicator with other oils or fluids and under different pressure and temperature conditions, please contact ELESA Technical Department or carry out tests in order to guarantee a proper use.

Special executions on request *(For sufficient quantities)*
- Column level indicators in different materials (POLYCARBONATE), for use with special fluids and/or at high temperatures.
- AISI 316 stainless steel or nickel-plated brass screws.
- Column level indicators with change-over electrical contact.
- Execution with PT100 temperature electrical probe for connection to PLC.
- Electrical sensors set at the following temperatures: 50°-60°-70°C.

Drilling template
Holes without burrs and chamfer

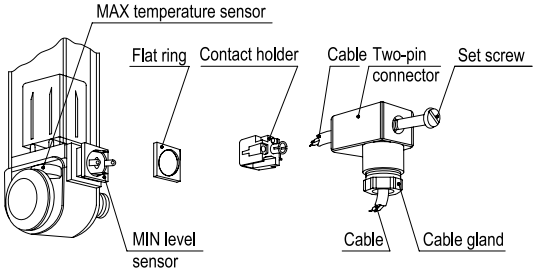


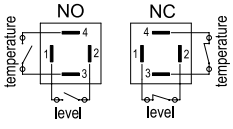
Drilling and installation data			
Description	**d'-0.2**	**f'±0.2**	**Maximum tightening torque [Nm]**
HCY.76	12.5	76	12
HCY.127	12.5	127	12
HCY.254	12.5	254	10

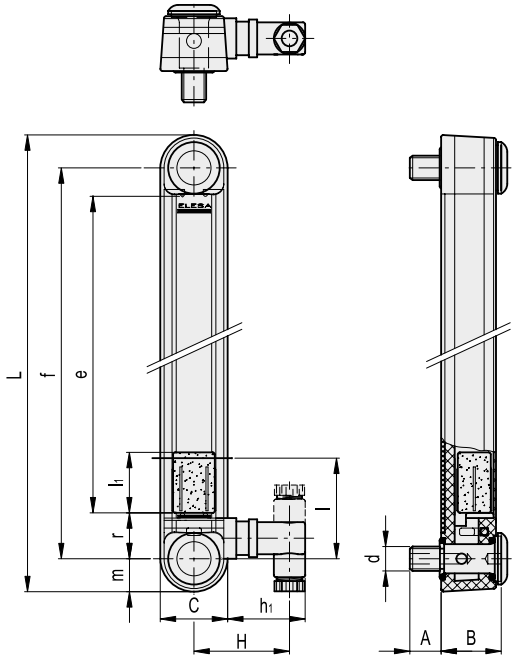
Electric characteristics	MIN level sensor
Power supply	AC/DC
Electric contacts	NO normally open NC normally closed
Maximum applicable voltage	NO: 150 Vac, 150 Vdc NC: 230 Vac, 230 Vdc
Maximum commutable opening capacity	NO: 1A NC: 2A
Maximum commutable power	NO: 20 W /20 V.A. NC: 40 W / 40 V.A.
Cable gland	Pg 7 (for cables in sheath with Ø 6 o 7 mm)
Conductors cross-section	Max 1.5 mm ^{2}

Electric characteristics	MAX temperature sensor
Power supply	AC/DC
Electric contacts	NO normally open NC normally closed
Maximum applicable voltage/ opening capacity	250 Vac - 10 A 60 Vdc - 3 A (resisteve loads)
Cable gland	Pg 7 (for cables in sheath with Ø 6 o 7 mm)
Conductors cross-section	Max 1.5 mm ^{2}

Do not mount this indicator in proximity to magnetic fields.







Standard Elements		Main dimensions													⚖
Code	Description	f	d	A	B	C	H	h1	L	e	l	l1	m	r	g
111151	HCY.76-E-ST-NO-M12	76	M12	21	29	32	46	37	108	41	40	17	16	20	175
111152	HCY.76-E-ST-NC-M12	76	M12	21	29	32	46	37	108	41	40	17	16	20	175
111161	HCY.127-E-ST-NO-M12	127	M12	21	29	32	46	37	159	93	40	29	16	20	173
111162	HCY.127-E-ST-NC-M12	127	M12	21	29	32	46	37	159	93	40	29	16	20	173
111171	HCY.254-E-ST-NO-M12	254	M12	21	29	32	46	37	286	219	40	29	16	20	240
111172	HCY.254-E-ST-NC-M12	254	M12	21	29	32	46	37	286	219	40	29	16	20	240

HFL-E

Rapid levels with float

RoHS IP65 PA +80° -20°

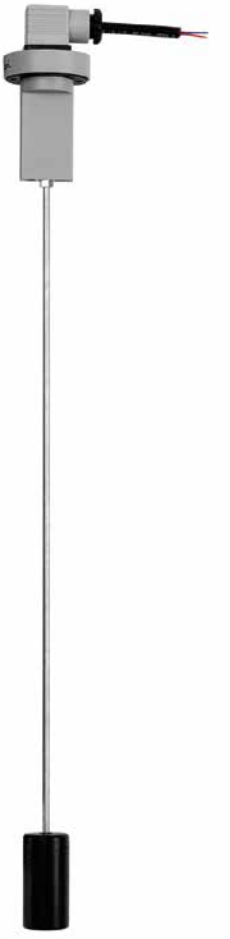
- **Material**
  Polyamide-based technopolymer (PA), colour grey. Resistant to solvents, oils, greases and other chemicals.
- **Packing rings**
  - TPE flat gasket (HFL-EF).
  - NBR synthetic rubber O-Ring (HFL-ER).
- **Connector with sensor block**
  Side output, grey colour, with a built-in reed switch. It offers protection class IP 65 according to UNI 529 table against water sprays.
  For a correct assembly see Warning (page 99).
- **Dipstick**
  AISI 304 stainless steel tube, fastened to the body by a nickel-plated brass coupler.
- **Float**
  NBR synthetic rubber.
- **Standard executions**
  - **HFL-EF**: assembly by means of a flange with 3 holes at 120° for 3 zinc-plated steel screws with hexagon socket, supplied. It can be assembled also with 2 holes at 180°.
  - **HFL-ER**: assembly by means of a 1" Gas threaded coupler.
- **Maximum continuous working temperature**
  80°C.

Special executions on request

- Level indicators in different materials for use with particularly aggressive fluids and/or maximum working temperature up to 120°C.
- Dipsticks in different lengths and/or in AISI 316 stainless steel.
- Float with through holes to allow positioning according to different needs, avoiding cutting the dipstick.
- Double dipstick and double float manufactured for double minimum and maximum level reading.

Features and applications

HFL-E rapid levels show a minimum or maximum default level, according to the application needs.
Highly versatile, these rapid levels allow to define the most accurate set point by simply disassembling the dipstick float and cutting the dipstick exactly where needed, according to the specifications shown in the table.
Free from magnetic parts, the float is integral to the dipstick making this level indicator ideal for use in tanks containing dirty liquids, water, oil, coolant oil, also with iron metal parts or foams. Moreover, the operation is independent of the fluid electrical conductivity.
To ensure utmost safety, the electrical components are separated from the tank and perfectly sealed by means of ultrasound welding.



Electric characteristics	
Power supply	AC / DC
Electric contacts	NO normally open in the presence of liquid NC normally closed in the presence of liquid
Maximum commutable voltage	230 Vdc, 230 Vac
Maximum opening capacity	3 A
Commutable power	60 W 60 VA
Cable gland	Pg9 / Pg11 UNIFIED
Conductors cross-section	Max 1.5 mm ^{2}

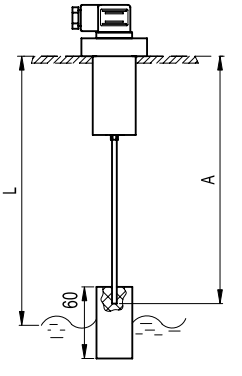
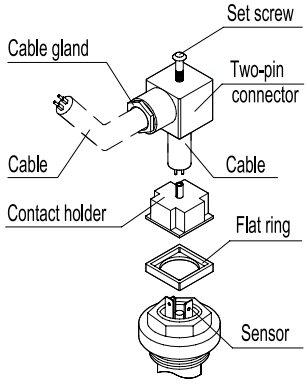


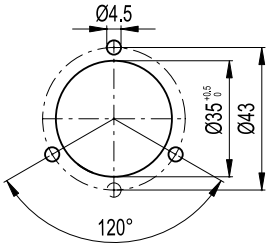
Table for cutting dipstick	
Control quote L=(mm)	Dipstick cut quote for minimum level A=(mm)
120	116
140	137
160	158
180	179
200	200
220	221
240	242
260	263
280	284
300	305
320	326
340	347
360	368
380	389
400	410
420	431
440	452
460	473
480	494
500	515

Two-pin connectors assembly instructions

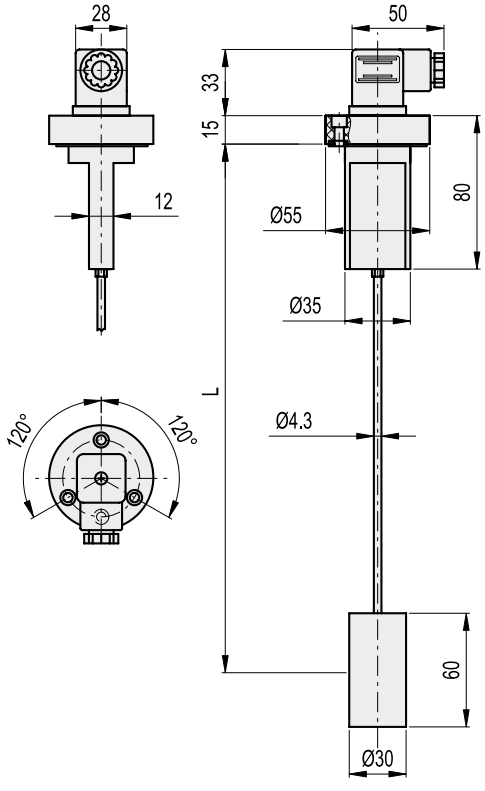
1. Remove the connectors from the indicator by unscrewing the set screw placed in the bottom, take the contact holders out and loosen the cable glands.
2. Slip on the two-pole cable into the connectors (standard connectors) and connect the wires to the terminals nr. 1 and nr. 2 of the relative contact holders.
3. Assemble by pressing the contact holders into the realtive connectors in the required position.
4. Screw the connectors to the indicator and then tighten the cable glands.



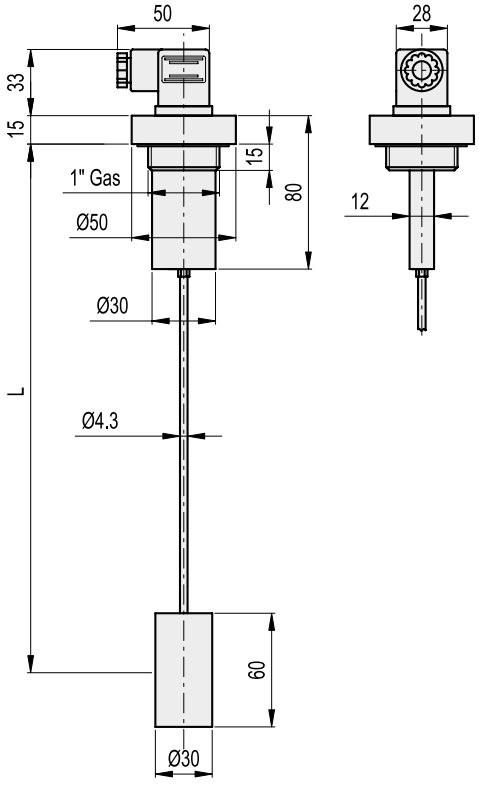
Drilling template for HFL-EF



HFL-EF



HFL-ER



Standard Elements		Main dimension	⚖
Code	Description	L	g
111281	HFL-EF-NO	500	135
111283	HFL-EF-NC	500	135

Standard Elements		Main dimension	⚖
Code	Description	L	g
111286	HFL-ER-NO	500	135
111288	HFL-ER-NC	500	135

HFLT-E

Rapid levels with float

RoHS IP65 PA +80° -20°

- **Material**
  Polyamide-based technopolymer (PA), colour grey. Resistant to solvents, oils, greases and other chemicals.
- **Packing rings**
  - TPE flat gasket (HFLT-EF).
  - NBR synthetic rubber O-Ring (HFLT-ER).
- **Connector with sensor block**
  Side output, grey colour, with a built-in reed switch. It offers protection class IP 65 according to UNI 529 table against water sprays.
  For a correct assembly see Warnings (page 99).
- **Dipstick**
  Featuring two raised scales (oil and water) marking the exact cutting point so as to obtain the desired set point (dimension L).
- **Standard executions**
  - **HFLT-EF**: assembly by means of a flange with 3 holes at 120° for 3 zinc-plated steel screws with hexagon socket, supplied, and a threaded coupler.
  - **HFLT-ER**: assembly by mans of a 1" Gas threaded coupler.
- **Maximum continuous working temperature**
  80°C.

Special executions on request

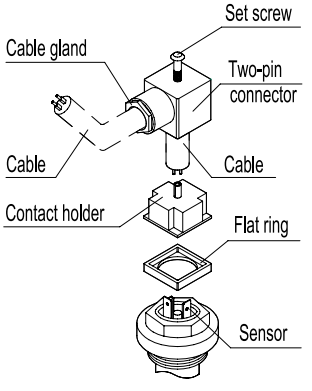
- Polypropylene body (PP).
- With flange with 6 holes for fastening with cylindrical head screws (supplied), in addition to the threaded body.
- For use with maximum working temperature up to 120°C.

Features and applications

HFLT-E rapid levels detects a predefined minimum or maximum level, according to the application needs.
Highly versatile, these rapid levels allow to define both the most accurate set point required by simply disassembling the dipstick float and cutting the dipstick exactly where needed, and the kind of operation required, with normally open (NO) or normally closed (NC) contact in presence of liquid, by loosening the fastening nut on the opposite end of the dipstick and positioning the inner magnet according to specific requirements (refer to the adhesive label).
The magnet is generally supplied with normally open (NO) contact in presence of liquid.
Free from magnetic parts, the float is integral to the dipstick making this level indicator ideal for use in tanks containing dirty liquids, water, oil, coolant oil, also with iron metal parts or foams. Moreover, the operation is independent of the fluid electrical conductivity. To ensure utmost safety, the electrical components are separated from the tank and perfectly sealed by means of ultrasound welding.

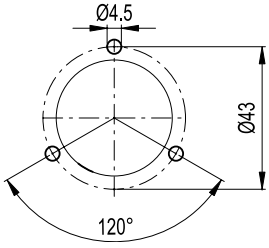
Two-pin connectors assembly instructions

1. Remove the connectors from the indicator by unscrewing the set screw placed in the bottom, take the contact holders out and loosen the cable glands.
2. Slip on the two-pole cable into the connectors (standard connectors) and connect the wires to the terminals nr. 1 and nr. 2 of the relative contact holders.
3. Assemble by pressing the contact holders into the realtive connectors in the required position.
4. Screw the connectors to the indicator and then tighten the cable glands.

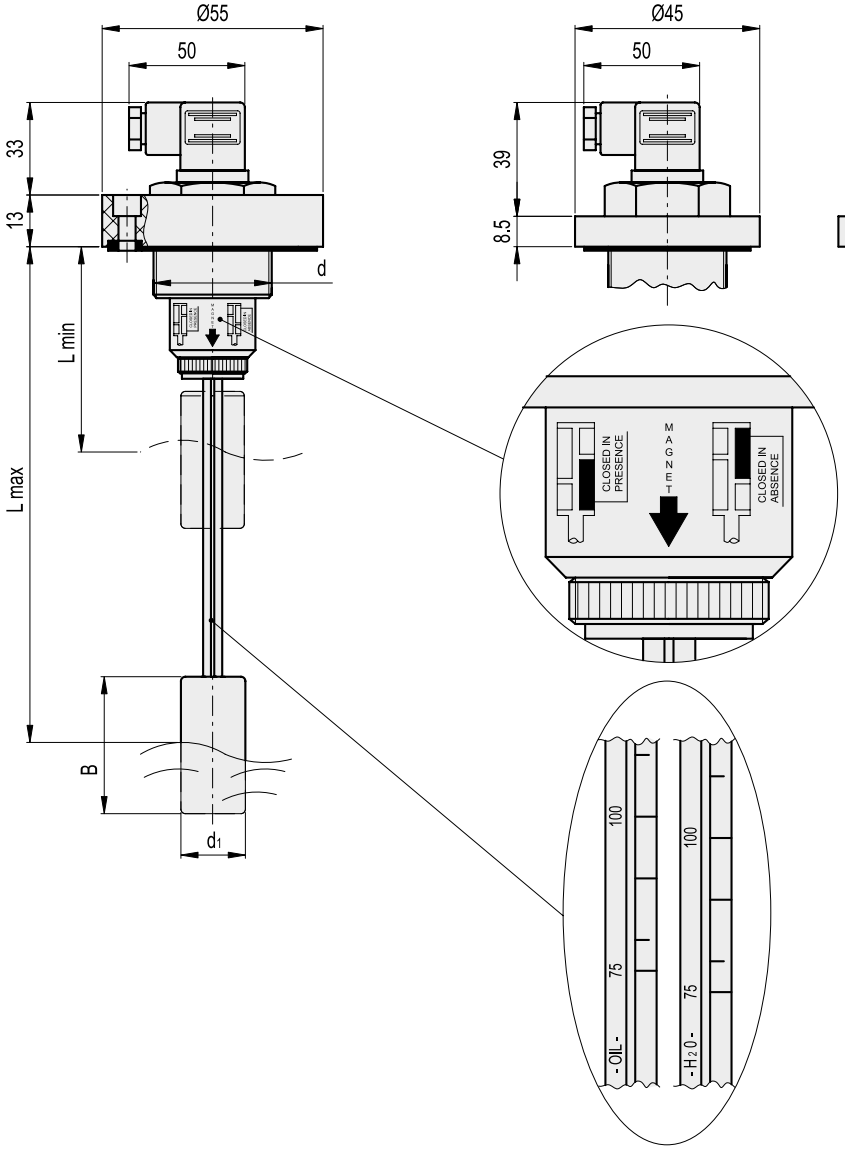


Electric characteristics	
Power supply	AC / DC
Electric contacts	NO normally open in the presence of liquid NC normally closed in the presence of liquid
Maximum commutable voltage	230 Vdc, 230 Vac
Maximum opening capacity	2 A
Commutable power	40 W 40 VA
Cable gland	Pg9 / Pg11 UNIFIED
Conductors cross-section	Max 1.5 mm ^{2}

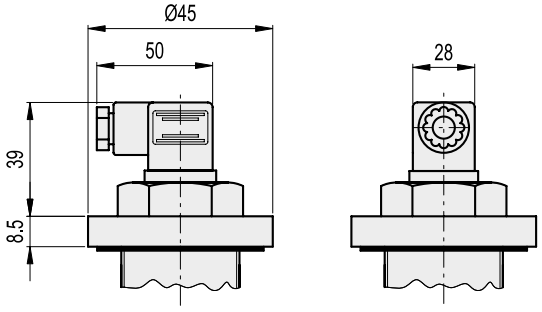
Drilling template for HFLT-EF



HFLT-EF



HFLT-ER



Standard Elements		Main dimensions					⚖
Code	Description	d	L min	L max	d1	B	g
111276	HFLT-EF-3/4	G 3/4	75	250	23	50	110
111278	HFLT-EF-1	G 1	85	360	30	60	110

Standard Elements		Main dimensions					⚖
Code	Description	d	L min	L max	d1	B	g
111271	HFLT-ER-3/4	G 3/4	75	250	23	50	110
111273	HFLT-ER-1	G 1	85	360	30	60	110

TECHNICAL DATA

The technical data presented here refer mainly to the ELESA+GANTER Standard elements, made of engineering plastics and metal materials.
The main technologies used for the manufacture of plastic products are:
• compression/transfer moulding for Duroplasts
• injection moulding for Technopolymers.
This primary process may be followed by secondary operations such as machining, finishing, assembly, decoration to customize the product (tampoprinting), packaging to guarantee adequate protection during transportation and identification of the product.

1. PLASTICS

DUROPLASTS: Phenolic based (PF) thermosetting plastics that harden during moulding due to irreversible polymerization.
TECHNOPOLYMERS: Thermoplastic polymer materials in which the chemical composition of the molecular chain provides a wide range of mechanical, thermal, and technological properties. The transformation process is based on the melting and subsequent hardening by solidification of the material in the mould. The material itself has a low environmental impact because it can be recycled (reversible solidification).

The main TECHNOPOLYMERS used by ELESA+GANTER						
PA	PA-T	PP	POM	PC	PBT	TPE
Glass-fibre reinforced polyamide, glass reinforced polyamide, polyamide-based super-polymers	Special transparent polyamide	Glass-fibre reinforced polypropylene or with mineral fillers	Acetal resin	Special polycarbonate	Special polyester	Thermoplastic elastomer

1.1 Mechanical Strength

DUROPLASTS: The use of a mineral filler and natural textile fibres, and optimum selection of the base resin give this material an excellent mechanical strength and a good impact strength.
TECHNOPOLYMERS: The rich selection of basic polymers available and the possibility of combining these with reinforcing fillers or additives, make a wide range of performance levels possible in terms of mechanical strength, impact strength, creep and fatigue.

1.2 Thermal Resistance

The use of thermosetting materials and reinforced thermoplastic polymers with a high thermal resistance, enables ELESA+GANTER to obtain products with great thermal stability and a limited variation in their mechanical properties at both high and low temperatures.
The recommended operating temperature range for each plastic product in this catalogue is indicated by the "Temperature" symbol, which is shown on the left.
Within this temperature range:
• The material is stable and no significant degradation takes place.
• The user does not normally encounter any problems with the basic function of the product.

The mechanical strength, impact strength, maximum torque and maximum working pressure values indicated in the catalogue were obtained from tests carried out under laboratory conditions (23°C - relative humidity of 50%). These values may vary over the working temperature range indicated. Customers are therefore themselves responsible for checking the product's actual performance in their specific thermal working conditions. A very general indication as to the working temperature range for the various types of plastics is given in the table below:

Duroplasts (PF)	from -20°C to 100°/110°C
Special, high-resilience polypropylene-based (PP) technopolymers	from 0°C to 80°/90°C
Glass-fibre reinforced polypropylene-based (PP) technopolymers	from 0°C to 100°C
Polyamide-based (PA) technopolymers	from -20°C to 90°C
Glass-fibre reinforced polyamide-based (PA) technopolymers	from -30°C to 130°/150°C
Glass-fibre reinforced polyamide-based (PA) technopolymers for high temperatures	from -30°C to 200°C

For some types of products with specific functional requirements, narrower operating temperature ranges are recommended.

1.3 Strength and surface hardness

DUROPLAST: The material and its glossy finish enables the surfaces to be kept in perfect condition, even after prolonged use in the presence of metal machining residues or in abrasive environments like those, for example, of metal machining applications with machine tools.
TECHNOPOLYMER: The surface hardness values are lower than those of Duroplast, but are still within the 60-98 Rockwell range, M scale. Technopolymers are however tougher and have a greater impact strength than Duroplasts.

1.4 Resistance to chemical agents

Some of the tables in Chapter 6 describe the resistance of the plastics used for ELESA+GANTER products at an ambient temperature of 23°C, in the presence of the various chemical agents they may come into contact with in an industrial environment (acids, bases, solvents, lubricants, fuels, and aqueous solutions).
The tables on page 124, 125 and 128 indicate 3 classes of resistance:

- good resistance = the product's functional and aesthetic properties remain unchanged.
- fair resistance = the functional and/or aesthetic properties are affected to a degree that depends on the type of product and the working conditions. Some limitations in specific applications.
- poor resistance = product susceptible to chemical aggression. Not recommended for use.

As a general rule, chemical resistance decreases as the working temperature and mechanical stresses to which the product is subjected increase.
Testing of the product's resistance to chemical agents is essential for use in the presence of high temperatures and high levels of mechanical stress.

1.5 Resistance to atmospheric agents and UV rays

In most cases, ELESA+GANTER plastic standards are used for indoor applications. In any case, due to the properties of the materials and the measures taken during the design stage, these products may also be used for outdoor applications, where they are exposed to various atmospheric agents.

- Rapid changes in temperature: within the working temperature range recommended for each product, rapid changes in temperature do not create problems due to the impact strength of the materials used.
- The presence of water or moisture may result in processes of hydrolysis and the absorption of a certain percentage of the water/moisture until a state of equilibrium is reached. This may alter some of the material's mechanical properties. Examples of materials that absorb water include polyamides (PA), transparent polyamides (PA-T, and PA-T AR) and duroplasts (PF).
  Products made of these materials may undergo slight changes in size due to the absorption of water, which may affect dimensional tolerances. During the design stage, ELESA+GANTER normally takes these possible variations into account in order to minimise their effects and to guarantee compliance with the technical specifications. The absorption of water results in a significant increase in impact strength.

The following polymers do not absorb water: polypropylene (PP), thermoplastic elastomers (TPE), and acetal resin (POM).
Occasional contact with rainwater followed by "drying" does not generally pose any problems in terms of the strength of the product.
When used in outdoor applications, it is advisable to prevent water accumulating on the product by installing in such a way that water runs off it quickly.

- Exposure to the sunlight and UV rays in particular. Specific resistance tests have been carried out using specific equipment for accelerated ageing testing, in accordance with the ISO 4892-2 standard, and setting the following parameters:
  - Radiation power: 550 [W]/[m]^2
  - Internal temperature (Black Standard Temperature, BST): 65°C
  - OUTDOOR filter that simulates exposure to the open air, with low shielding against UV rays.
  - Relative humidity: 50%.

  The relation between the hours of testing and the hours of actual exposure to an outdoor environment ("Equivalent Hours") obviously depends on the weather conditions of each geographic area. Taking the Average Radiant Exposure per Day (ARED) as a basis for comparison, the reference values adopted on an international scale include:
  - Miami Equivalent Hours = high intensity exposure, typical of countries with a tropical or equatorial climate (ARED = 9.2 MJ/m^2)
  - Central Europe Equivalent Hours = mean intensity of exposure, typical of continental climates (ARED = 2 MJ/m^2).

At the end of prolonged tests carried out at the ELESA+GANTER laboratories, the variation in mechanical strength was measured (tensile/compression breaking, and impact breaking) was measured.
In general, the results show that the mechanical strength of polyamide (PA), polypropylene (PP) and Duroplast (PF) products is not significantly reduced by exposure to UV rays. As to the aesthetic appearance of samples exposed to the action of the UV rays, in some cases a slight variation in the surface appearance of the product was found, on completion of the tests. For further details on UV ageing tests on specific products, contact the ELESA+GANTER Technical Department.

1.6 Surface Finish and Cleanability

When moulding technopolymers, it is technically easier to make products with a rough matte surface finish, which hides any aesthetic defects such as shrinkage cavities, flow marks, or joining marks caused by non-optimum moulding processes.
However, a rough matte finish makes it more difficult to clean and handle the component after prolonged use. ELESA+GANTER technopolymer standards have a very fine matte finish so that the product remains easy to clean in time, and is easier to handle for the user. Some groups of technopolymer products have recently been developed with a completely glossy finish, so that they remain clean for a long time.

1.7 Compliance with International Standards

Over the past few years, the national and international regulatory authorities have laid down a series of regulations for the control of substances that are harmful to man or the environment and for the environment safety management in the industrial field.
The ELESA+GANTER Technical Department is able to give any kind of assistance also providing any techinical information required on the following International Standards:

- European Directive 2000/53/CE, also known as the ELV (End Life of Vehicles) directive, which is applicable to the automotive. This provides for a gradual reduction in the quantity of heavy metals (Pb, Cd, Hg, and Cr6) present in vehicles.

- European Directive 2002/95/CE, also known as the RoHS, Restriction of Hazardous Substances, directive, which is applicable to the field of electrical and electronic equipment. This provides for a gradual reduction in the quantity of heavy metals (Pb, Cd, Hg, and Cr6) and PBB and PBDE type halogens present in the components used in the electrical and electronic industries.
- European Directive 94/9/CE (known as the ATEX directive), for products used in a potentially explosive atmosphere.
- WEEE Directive (Waste of Electrical and Electronic Equipment).
- European Regulation REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) n.1907/2006 of 18/12/2006 for the use of chemical substances.

1.8 Competence of the ELESA+GANTER Technical Department

Ongoing research and experimentation with new materials that offer increasingly high levels of performance is part of the principle of continuous improvement on which the ELESA+GANTER Quality System is based. Our partnership with leading plastics manufacturers in the world and the use of mechanical and process simulation programs, also allows us to offer the material that best suits the Client's specific application.

2. METAL MATERIALS

Many ELESA+GANTER parts are completely made out of metal. Plastic elements very often contain inserts or functional components made out of metal. The tables in chapter 6 describe the chemical composition and mechanical strength as per the reference standards for the metals used.
Surface treatments for metal inserts and parts: the surface of metal inserts or functional parts is generally treated to ensure maximum protection against environmental agents, in order to maintain the product's aesthetic and functional qualities.
The protective treatments normally used include:

- Burnishing of steel bushings and hubs
- Zinc-plating of threaded studs (Fe/Zn 8 in compliance with the UNI ISO 2081 standard)
- Matte chromium plating of lever arms and revolving handles shanks.

Metal parts made of brass or stainless steel do not normally require surface treatment.
On request and for sufficient quantity, metal parts can be supplied with protective surface treatments like black/yellow zinc-plating, nickel-plating, Niploy-Kanigen process, chromium plating, anodising and others, heat treatments like nitriding, hardening and case-hardening.

3. OTHER MATERIALS

Gaskets: ELESA+GANTER normally uses gaskets made of synthetic nitrile butadiene rubber (NBR) or acrylonitrile butadiene rubber (BUNA N) for its products, with hardness values ranging from 70 to 90 SHORE A depending on the type of product considered. The working temperature range for continuous use is -30°C to +120°C. Where a higher chemical and thermal resistance is required, that is, for products in the HCX.INOX, HCX.INOX-BW and HGFT.HT-PR series, gaskets made of FKM fluorinated rubber are used. For an indication of the chemical resistance values, see the table in chapter 6. The working temperature range is -25°C to +210°C. On request and for sufficient quantity, flat washers and O-rings made of special materials such as EPDM, silicone rubber, or others may be supplied.
Air filters for filler breather caps (SFC., SFN., SFP., SFV., SFW., SMN. and SMW. series):

- TECH-FOAM type filters: polyester-based polyurethane foam mesh, degree of filtration 40 microns, recommended for temperatures of between -40°C and +100°C for continuous use, and brief peak temperatures of +130°C. This material does not swell in contact with water, petrol, soap, detergents, mineral oils or grease. Some solvents may cause slight swelling of the foam (benzene, ethanol, and chloroform).
- TECH-FIL type filters: made of zinc-plated iron wire (quality as per DIN 17140-D9-W.N.R 10312, zinc-plated as per DIN 1548), degree of filtration 50-60 microns.

4. SPECIAL EXECUTIONS

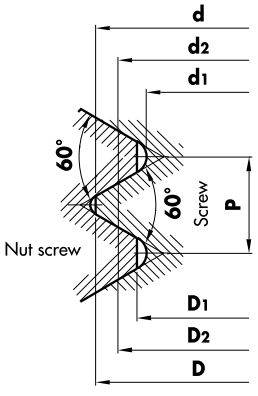
The range of ELESA+GANTER elements is extremely broad and offers designers valid alternatives as regards designs, properties and performance of materials, sizes..., to satisfy the most diverse applicational needs. The customer may however need to ask for changes to the standard part or have it made in different colours to adapt it to special applications. In these cases, the ELESA+GANTER engineers are at the customer's full disposal to satisfy these requests for specially designed parts which, as such and for the modifications they may entail to the mould, must be required in sufficient quantity.

5. TEST VALUES

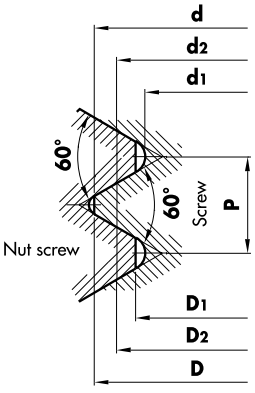
All the information about the test values are based on our experience and on laboratory tests conducted under specific standard conditions and in a necessarily limited time interval. Any values indicated must therefore be taken only as a reference for the designer who will apply adequate safety coefficients to them according to the application of the product. The designer and the purchaser are responsible for checking the suitability of our products for the purpose for which they are to be used under the actual operating conditions.

6. TECHNICAL TABLES

CONVERSION TABLE			
Parameter	IS unit	To convert IS unit into	multiply by
Force	N	kg	0.1
Torque	Nm	kg · m	0.1
Work	J	kg · m	0.1
To convert	**into**		**multiply by**
mm	inches		0.039
N	lbf		0.224
Nm	lb · ft		0.737
J	ft · lb		0.737
g	lb		0.002
°C	°F		(°C · 9/5) + 32

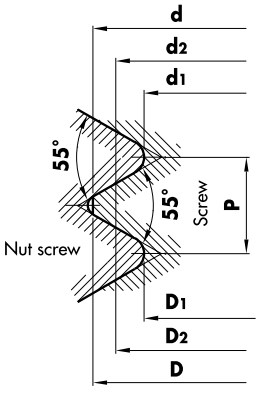


ISO METRIC FINE THREADS - DIN 13 (thread limits)													
	P (mm)	Screw with tolerance of 6g						Nut screw with tolerance of 6H					
		Ø major d		Ø pitch d2		Ø minor d1		Ø major D		Ø pitch D2		Ø minor D1	
		max.	min.	max.	min.	max.	min.	min.	max.	min.	max.	min.	max.
M5	0.5	4.980	4.874	4.655	4.580	4.367	4.273	5.000	Not specified	4.675	4.775	4.459	4.599
M6	0.5	5.980	5.874	5.655	5.570	5.367	5.263	6.000		5.675	5.787	5.459	5.599
M8	0.5	7.980	7.874	7.655	7.570	7.367	7.263	8.000		7.675	7.787	7.459	7.599
M10	0.5	9.980	9.874	9.655	9.570	9.367	9.263	10.000		9.675	9.787	9.459	9.599
M12	0.5	11.980	11.874	11.655	11.565	11.367	11.258	12.000		11.675	11.793	11.459	11.599
M6	0.75	5.978	5.838	5.491	5.391	5.058	4.929	6.000		5.513	5.645	5.188	5.378
M8	0.75	7.978	7.838	7.491	7.391	7.058	6.929	8.000		7.513	7.645	7.188	7.378
M10	0.75	9.978	9.838	9.491	9.391	9.058	8.929	10.000		9.513	8.645	9.188	9.378
M12	0.75	11.978	11.838	11.491	11.385	11.058	10.923	12.000		11.513	15.653	11.188	11.378
M16	0.75	15.978	15.838	15.491	15.385	15.508	14.923	16.000		15.513	11.653	15.188	15.378
M8	1	7.974	7.974	7.324	7.212	6.747	6.596	8.000		7.350	7.500	6.917	7.153
M10	1	9.974	9.974	9.324	9.212	8.747	8.596	10.000		9.350	9.500	8.917	9.153
M12	1	11.974	11.974	11.324	11.206	10.747	10.590	12.000		11.350	11.510	10.917	11.153
M16	1	15.974	15.974	15.324	15.206	14.747	14.590	16.000		15.350	15.510	14.917	15.153
M20	1	19.974	19.974	19.324	19.206	18.747	18.590	20.000		19.350	19.510	18.917	19.153
M12	1.5	11.968	11.732	10.994	10.854	10.128	9.930	12.000		11.026	11.216	10.376	10.676
M14	1.5	13.968	13.732	12.994	12.854	12.128	11.930	14.000		13.026	13.216	12.376	12.676
M16	1.5	15.968	15.732	14.994	14.854	14.128	13.930	16.000		15.026	15.216	14.376	14.676
M18	1.5	17.968	17.732	16.994	16.854	16.128	15.930	18.000		17.026	17.216	16.376	16.676
M20	1.5	19.968	19.732	18.994	18.854	18.128	17.930	20.000		19.026	19.216	18.376	18.676
M22	1.5	21.968	21.732	20.994	20.854	20.128	19.930	22.000		21.026	21.216	20.376	20.676
M26	1.5	25.968	25.732	24.994	24.844	24.128	23.920	26.000		25.026	25.226	24.376	24.676
M27	1.5	26.968	26.732	25.994	25.844	25.128	24.920	27.000		25.026	26.226	25.376	25.676
M30	1.5	29.968	29.732	28.994	28.844	28.128	27.920	30.000		29.026	29.226	28.376	28.676
M35	1.5	34.968	34.732	33.994	33.844	33.128	32.920	35.000		34.026	34.226	33.376	33.676
M40	1.5	39.968	39.732	38.994	38.844	38.128	37.920	40.000		39.026	39.226	38.376	38.676
M20	2	19.962	19.682	18.663	18.503	17.508	17.271	20.000		18.701	18.913	17.835	18.210
M24	2	23.962	23.682	22.663	22.493	21.508	21.261	24.000		22.701	22.925	21.835	22.210
M30	2	29.962	29.682	28.663	28.493	27.508	27.261	30.000		28.701	28.925	27.835	28.210
M36	2	35.962	35.682	34.663	34.493	33.508	33.261	36.000		34.701	34.925	33.835	34.210
M42	2	41.962	41.682	40.663	40.493	39.508	39.261	42.000		40.701	40.925	39.835	40.210



ISO METRIC THREADS - DIN 13 (thread limits)

	P (mm)	Screw with tolerance of 6g						Nut screw with tolerance of 6H					
		Ø major d		Ø pitch d2		Ø minor d1		Ø major D		Ø pitch D2		Ø minor D1	
		max.	min.	max.	min.	max.	min.	min.	max.	min.	max.	min.	max.
M3	0.5	2.980	2.874	2.655	2.580	2.367	2.273	3.000	Not specified	2.675	2.775	2.459	2.599
M4	0.7	3.978	3.838	3.523	3.433	3.119	3.002	4.000		3.545	3.663	3.242	3.422
M5	0.8	4.976	4.826	4.456	4.361	3.995	3.869	5.000		4.480	4.605	4.134	4.334
M6	1	5.974	5.794	5.324	5.212	4.747	4.596	6.000		5.350	5.500	4.917	5.153
M8	1.25	7.972	7.760	7.160	7.042	6.438	6.272	8.000		7.188	7.348	6.647	6.912
M10	1.5	9.968	9.732	8.994	8.862	8.128	7.938	10.000		9.026	9.206	8.376	8.676
M12	1.75	11.966	11.701	10.829	10.679	9.819	9.602	12.000		10.863	11.063	10.106	10.441
M14	2	13.962	13.682	12.663	12.503	11.508	11.271	14.000		12.701	12.913	11.835	12.210
M16	2	15.962	15.682	14.663	14.503	13.508	13.271	16.000		14.701	14.913	13.835	14.210
M18	2.5	17.958	17.623	16.334	16.164	15.252	14.541	18.000		16.376	16.600	15.294	15.744
M20	2.5	19.958	19.623	18.344	18.164	16.891	16.625	20.000		18.376	18.600	17.294	17.744
M24	3	23.952	23.577	22.003	21.803	20.271	19.955	24.000		22.051	22.316	20.752	21.252
M30	3.5	29.947	29.522	27.674	27.462	26.158	25.189	30.000		27.727	28.007	26.211	26.771

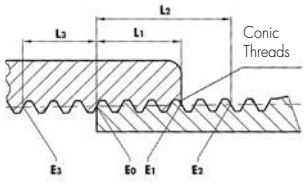


Cylindrical GAS-BSP THREADS DIN 228 (thread limits)

*	Z threads x 1"	Screw with tolerance of Classe B						Nut screw					
		Ø major d		Ø pitch d2		Ø minor d1		Ø major D		Ø pitch D2		Ø minor D1	
		max.	min.	max.	min.	max.	min.	min.	max.	min.	max.	min.	max.
G1/8"	28	9.728	9.514	9.147	8.933	8.566	8.298	9.728	Not specified	9.147	9.254	8.566	8.848
G 1/4"	19	13.157	12.907	12.301	12.051	11.445	11.133	13.157		12.301	12.426	11.445	11.890
G 3/8"	19	16.662	16.408	15.806	15.552	14.950	14.632	16.662		15.806	15.933	14.950	15.395
G 1/2"	14	20.955	20.671	19.793	19.509	18.631	18.276	20.955		19.793	19.935	18.631	19.172
G 5/8"	14	22.911	22.627	21.749	21.465	20.587	20.232	22.911		21.749	21.891	20.587	21.128
G 3/4"	14	26.441	26.157	25.279	24.995	24.117	23.762	26.441		25.279	25.421	24.117	24.658
G 7/8"	14	30.201	29.917	29.039	28.755	27.877	27.522	30.201		29.039	29.181	27.877	28.418
G 1"	11	33.249	32.889	31.770	31.410	30.291	29.841	33.249		31.770	31.950	30.291	30.931
G 1 1/8"	11	37.897	37.537	36.418	36.058	34.939	34.489	37.897		36.418	36.598	34.939	35.579
G 1 1/4"	11	41.910	41.550	40.431	40.071	38.952	38.502	41.910		40.431	40.611	38.952	39.592
G 1 3/8"	11	44.323	43.963	42.844	42.484	41.365	40.915	44.323		42.844	43.024	41.365	42.005
G 1 1/2"	11	47.803	47.443	46.324	45.964	44.845	44.395	47.803		46.324	46.504	44.845	45.485
G 1 3/4"	11	53.746	53.386	52.267	51.907	50.788	50.338	53.746		52.267	52.447	50.788	51.428
G 2"	11	59.614	59.254	58.135	57.775	56.656	56.206	59.614		58.135	58.315	56.656	57.296

* G in accordance with UNI-ISO 228

$$P = \frac{25.4}{Z}$$



NPT THREADS (Thread limits, from ASME B1-20)

Nominal Pipe Size	Threads per Inch.	Mean Ø of external threads beginning	Fit length		External threads length		Real internal threads length	
				Mean Ø		Mean Ø		Mean Ø
1/4	18	0.477	0.227	0.491	0.401	0.502	0.166	0.467
3/8	18	0.612	0.24	0.627	0.407	0.637	0.166	0.601
1/2	14	0.758	0.32	0.778	0.533	0.791	0.214	0.745
3/4	14	0.967	0.339	0.988	0.545	1.001	0.214	0.954

PROPERTIES OF METAL MATERIALS
STAINLESS STEELS

Description	AISI 303	AISI 304+Cu	AISI 304	AISI 316	AISI 316 LHC	AISI 301	AISI 302	AISI CF-8
Designation in accordance with EN 10088-1-2-3 EN 10283 (AISI CF-8) SINT C40 (AISI 316 LMC)	X 8 CrNiS 18-9	X 3 CrNiCu 18-9-4	X 5 CrNi 18-10	X 5 CrNiMo 17-12	Sint C40 X 2 CrNiMo 17-12-2	EN 100088-1;-2;-3 X10CrNi 18-8	X 10 CrNi 18-09	EN 10283 GX5CrNi 19-10
% components of alloy	C ≤ 0.10 Si ≤ 1.0 Mn ≤ 2.0 P ≤ 0.045 S ≤ 0.15 ÷ 0.35 Cr 17.0 ÷ 19.0 Ni 8.0 ÷ 10.0	C ≤ 0.04 Si ≤ 1.0 Mn ≤ 2.0 P ≤ 0.045 S ≤ 0.030 Cr 17.0 ÷ 19.0 Ni 8.5 ÷ 10.5	C ≤ 0.07 Si ≤ 1.0 Mn ≤ 2.0 P ≤ 0.045 S ≤ 0.030 Cr 17.0 ÷ 19.5 Ni 8.0 ÷ 10.5	C ≤ 0.08 Si ≤ 1.0 Mn ≤ 2.0 P ≤ 0.045 S ≤ 0.030 Cr 16.0 ÷ 18.5 Ni 10.0 ÷ 13.0	C ≤ 0.08 Si ≤ 0.9 Mn ≤ 0.1 Mo ≤ 2.0 ÷ 4.0 Cr 16.0 ÷ 19.0 Ni 10.0 ÷ 14.0	C ≤ 0.05 ÷ 0.15 Si ≤ 2.0 Mn ≤ 2.0 P ≤ 0.045 S ≤ 0.015 Cr 16.0 ÷ 19.0 Mo ≤ 0.8 Ni 6.0 ÷ 9.5	C ≤ 0.08 Si ≤ 0.6 Mn ≤ 1.2 Cr 18.0 Ni 9.0	C ≤ 0.07Si ≤ 2.0 Si ≤ 1.5 Mn ≤ 1.5 P ≤ 0.04 S ≤ 0.03 Cr 18.0 ÷ 20.0 Ni 8.0 ÷ 11.0
Minimum load at breakage Rm N/mm^2	500 - 700	450 - 650	500 - 700	500 - 700	330	500 - 750	600 - 800	440 - 640
Yield point Rp 0.2 n/mm^2	≥ 190	≥ 175	≥ 190	≥ 205	≥ 250	≥ 195	≥ 210	≥ 175
Machinability	Very good	Excellent	Fair	Fair	-	Poor	Good	Medium
Forgeability	Poor	Good	Good	Good	-	Good	Poor	-
Suitability for welding	Poor	Very good	Excellent	Good	-	Good	Poor	Good
Special features	Non-magnetic structure Excellent for machining on automatic machines	Non-magnetic structure suitable for low temperatures	Non-magnetic structure suitable for low temperatures may be used at up to 700 °C	Magnetic structure suitable for low temperatures	Non-magnetic structure	Austenitic structure	Magnetic structure suitable for low temperatures	Antimagnetc, austenitic structure
Corrosion resistance	Fair Due to sulphur content, use in environments containing acids or chlorides should be avoided.	Very good Resistant to corrosion in natural environments: water, urban or country climates with no significant concentrations of chlorides, in the food industry.	Good Resistant to corrosion in natural environments: water, urban or country climates with no significant concentrations of chlorides, in the food industry.	Excellent Resistant to corrosion also in marine environments or wet environments and in the presence of acids.	Medium By virtue of its coarser porosity the corrosion resistance is in general reduced as compared with stainless steel. Reservations especially in acid and salty environment.	Good Corrosion resistant in a natural environment; water, rural, urban and industrial atmosphere.	Fair	Good Corrosion resistant. Material is to a large extent comparable with AISI 304
Main fields of application	Construction of vehicles. Electronics. Furniture finishings.	Food, chemical and pharmaceutical industries. Agriculture. Construction of machines. Electronics. Shipping. Furniture finishings	Food, chemical and pharmaceutical industries. Agriculture. Construction of vehicles and machines. Building. Furniture finishings.	Food and chemical industries. Ship building and manufacture of components for marine environments or use in highly corrosive conditions.	Chemical, cellulose and paper industry. Paint, oil, soap and textile industry. Daires. Breweries.	Springs for temperature up to 300 °C. Tools (knives). Sheet metal for vehicles automotive industry. Chemical and food industry.	Used for the manufacture of springs in various fields of application.	Food, beverage and packing industry. Armatures. Pumps. Mixers.

The characteristics described should be treated as guidelines only. No guarantee is made.
The user is responsible for checking the exact operating conditions.

PROPERTIES OF METAL MATERIALS
CARBON STEELS, ZINC ALLOYS, ALUMINIUM AND BRASS

Description	Steel for threaded studs	Steel for threaded studs	Zinc alloy for pressure die-casting	Aluminium for handle tubes	Brass for bosses with threaded or plain hole	Brass for reinforcing square holes
Designation	11SMnPb37	C10C U+C	ZnA14Cu1	Alloy EN AW-6060	Brass CW614N	Brass CW508L
UNI standard	UNI EN 10277 : 2000	UNI EN 10263-2 : 2003	UNI EN 1774 : 1999	UNI EN 573-3	UNI EN 12164	EN 12449 : 99
% components of alloy	C < = 0.14 Pb ≤ 0.20-0.35 Si ≤ 0.05 Mn 1.00 ÷ 1.50 P ≤ 0.11 S 0.340.40 Fe rest	C 0.08-0.12 Si ≤ 0.10 Mn 0.30-0.50 P ≤ 0.025 S ≤ 0.025 Al 0.02-0.06 Fe rest	Cu 0.7-1.1 Pb ≤ 0.003 Fe ≤ 0.020 Al 3.8-4.2 Sn ≤ 0.001 Si ≤ 0.02 Ni ≤ 0.001 Mg 0.035-0.06 Cd ≤ 0.003 Zn rest	Si 0.03-0.6 Fe 0.1-0.3 Cu ≤ 0.10 Mn ≤ 0.10 Mg 0.035-0.06 Cr ≤ 0.05 Zn ≤ 0.15 Ti ≤ 0.10 Total impurities ≤ 0.15 Al rest	Cu 57-59 Pb 2.5-3.5 Fe ≤ 0.30 Al ≤ 0.05 Sn ≤ 0.30 Si ≤ 0.90 Ni ≤ 0.30 Total impurities ≤ 0.20 Zn rest	Cu 62-64 Pb ≤ 0.10 Fe ≤ 0.10 Al ≤ 0.05 Sn ≤ 0.10 Ni ≤ 0.30 Total impurities ≤ 0.10 Zn rest
Tensile breaking load Rm [MPa]	400-650	510-520	280-350	120-190	490-530	340-360
Yield point Rp 0.2 [MPa]	≤ 305	/	220-250	60-150	/	/
Modulus of elasticity [Mpa]	/	/	100000	67000	100000	103400
Ultimate elongation %	9	58	2-5	16	12-16	45
Special features	Steel for high-speed machining. Used for parts obtained by turning.	Steel for moulding.			Brass for high-speed machining. Used for parts obtained by turning.	Brass for machining with good plastic deformability.

PROPERTIES OF PLASTIC MATERIALS
Resistance to chemical agents at ambient temperature (23°C)
TECNOPOLYMERS AND RUBBERS

CHEMICAL AGENTS AND SOLVENTS	Polyamide (PA)			Transparent polyamide (PA-T)			Alcohol-Resistant transparent polyamide (PA-T AR)			Polypropylene (PP)			Acetal resin (POM)			Soft-Touch thermoplastic elastomer (TPE)		Rubber NBR			Flourated Rubber FKM		
	notes	conc.%	23°C	notes	conc.%	23°C	notes	conc.%	23°C	notes	conc.%	23°C	notes	conc.%	23°C	notes	23°C	notes	conc.%	23°C	notes	conc.%	23°C
Acetic acid	Sol.	10	●	Sol.	10	●	Sol.	10	❒		40	●	Sol.	20	▲		●			▲			▲
Acetone		100	●			❒			●			●			●		●			▲			▲
Acrylonitrile		100	●			▲			▲								❒			▲			▲
Alimentary oils			●			●			●			●			●	Up to 60°C	●			●			●
Aluminium chloride	Sol.	10	●			●			●			●					●	Sol.		●	Sol.		●
Aluminium sulphate	Sol.	10	●	Sol.	10	●	Sol.	10	●			●					●	Sol.		●	Sol.		●
Ammonia	Sol.	10	●	Sol.	10	●	Sol.	10	●	Conc.		●					❒	Sol.		❒	Sol.		▲
Ammonia - gaseous			❒			●			●			●					❒			●			▲
Ammonium chloride	Sol.	10	●	Sol.	10	●	Sol.	10	●			●	Sol.	10	●		●			●	Sol.		●
Amyl alcohol		100	●			▲			●			●			●		●			●			●
Aniline		100	❒			▲			▲			●			●		▲			▲			●
Beer			●			●			●			●			●		●			●			●
Benzoic acid	Sol.	Sat.	❒	Sol.	10	▲	Sol.	10	❒		Sat.	●				Up to 60°C	●	Sol.		❒	Sol.		●
Benzol/benzene		100				●			●			▲			●		▲			▲			●
Boiling water	Swell.		❒	Swell.		❒	Swell.		❒			●					❒			❒			❒
Boric acid	Sol.	10	●			❒			❒		Sat.	●					●	Sol.		●			●
Butter			●			●			●			●			●		●			●	Sol.		●
Butyl acetate		100	●		100	●		100	●			●					❒						
Butyl alcohol		100	●			▲			●			●			●		●			●			●
Calcium chloride	Sol.	10	●			●			●	Sol.	50	●			●		●	Sol.		●	Sol.		●
Carbon disulphide		100	●									●					▲			▲			●
Carbon tetrachloride			●			❒			●			▲			●		▲			▲			●
Caustic soda 10%	Sol.	5,10	●	Sol.	5,10	●	Sol.	5,10	●	Sol.	5,10	●	Sol.	10	●		●	Sol.	5,10	❒	Sol.	5,10	▲
Caustic soda 50%	Sol.	50	❒	Sol.	50	●	Sol.	50	●	Sol.	50	●					●	Sol.	50	▲	Sol.	50	▲
Citric acid	Sol.	10	❒	Sol.	10	❒	Sol.	10	❒		10	●			●	Up to 60°C	●	Sol.		●	Sol.		●
Cloroform		100	●			▲			▲			▲					▲			▲			●
Copper sulphate	Sol.	10	●									●			●		●	Sol.		●	Sol.		●
Dichloropropan												❒					▲						
Distilled water			●			●			●			●			●		●			●			●
Edible fat			●			●			●						●		●			●			
Ethyl acetate		100	●		100	●		100	●			●			●		❒			▲			
Ethyl alcohol		96	●			▲			●		96	●			●		●			❒			❒
Ethyl chloride		100	●			▲			▲			▲								●			●
Ethyl ether		100	●			●			●			●					▲			❒			▲
Ethylene glycol			●			▲			❒			●					❒			●			●
Ferric chloride	Sol.	10	●			●			●			●			●		●	Sol.		●	Sol.		●
Formaldehyde (formalin)	Sol.	30	●	Sol.	40	❒	Sol.	40	●	Sol.	40	●					▲	Sol.	40	●	Sol.	40	●
Formic acid	Sol.	10	●	Sol.		▲	Sol.		▲	Sol.	10	●		100	▲	Up to 60°C	●	Sat.		●	Sat,		▲
Freon 11												❒			●					●	Sol.		❒
Freon 12	Liq.		●			●			●			❒			●					●			❒
Freon 13												❒			●					●			●
Gas oil			●			●			●			●			●		▲			●			●
Glycerine			●			●			●			●					▲			●			●
Glycol butylene		100	●			▲			❒								❒			●			●
Hydrochloric acid	Sol.	10	▲	Sol.	10	❒	Sol.	10	❒	Sol.	30	●	Sol.	10	▲	Up to 60°C	●		10	❒		10	●
Hydrofluoric acid	Sol.	40	▲	Sol.	10	▲	Sol.	10	▲	Sol.	40	●			▲		❒		50	▲	Sol.	50	●
Hydrogen peroxide	Sol.	3	▲	Sol.	3	▲	Sol.	3	▲		30	●	Sol.	90	▲		❒	Sol.	80	▲	Sol.	80	❒
Iodine tincture-alcoholic			▲			▲			▲			●					●						
Isopropyl alcohol			●			▲			●			●			●		●			❒			●
Kerosene			●			●			●			❒			●		▲			●			●
Lactic acid	Sol.	10	●	Sol.	10	❒	Sol.	10	❒	Sol.	20	●			●	Up to 60°C	●	Sol.		●	Sol.		●
Linseed oil			●			●			●			●			●	Up to 60°C	●			●			●

CHEMICAL AGENTS AND SOLVENTS	Polyamide (PA)			Transparent polyamide (PA-T)			Alcohol-Resistant transparent polyamide (PA-T AR)			Polypropylene (PP)			Acetal resin (POM)			Soft-Touch thermoplastic elastomer (TPE)		Rubber NBR			Flourated Rubber FKM		
	notes	conc.%	23°C	notes	conc.%	23°C	notes	conc.%	23°C	notes	conc.%	23°C	notes	conc.%	23°C	notes	23°C	notes	conc.%	23°C	notes	conc.%	23°C
Magnesium chloride	Sol.	10	●			●			●	Sol.	Sat.	●			●		●	Sol.		●	Sol.		●
Mercuric chloride	Sol.	6	●									●					●						
Mercury			●			●			●			●					●			●			●
Methyl acetate		100	●		100	●		100	●								❒						●
Methyl alcohol		100	●			▲			●		100	●			●		●			❒			▲
Methyl ethyl ketone			●			▲			●			❒			▲		▲			▲			▲
Methylene chloride		100	●			▲			▲			❒					▲			▲			●
Milk			●			●			●			●			●		●			●			●
Mineral oil			●			●			●			●			●	Up to 60°C	●			●			●
Nitric acid		10	▲	Sol.	2	❒	Sol.	2	❒	Sol.	10	●	Sol.	10	▲		❒	Sol.	10	❒	Sol.	10	❒
Oil			●			●			●			❒			●		▲			●			●
Oil ether			●			●			▲			●			●		▲						
Oils for transformers			●			●			●			❒			●	Up to 60°C	❒			●			●
Oleic acid		100	●			●			●	Sol.		●			●	Up to 60°C	●			❒			
Paraffin oil			●			●			●			●				Up to 60°C	●			●			●
Petrol			●			●			●			❒			●		▲	Swell.		❒			●
Petrol vapor			●			●			●	Swell.		❒			●		▲			❒			●
Phenol	Sol.		▲			▲			▲			●			▲		▲			▲			●
Phosporic acid	Sol.	10	▲			▲			▲	Sol.	85	●	Sol.	10	▲	Up to 60°C	●	Sol.	20	❒	Sol.	20	●
Potassium hydroxide 50%	Sol.	50	●	Sol.	50	●	Sol.	50	●	Sol.	50	●					●	Sol.	50	●	Sol.	50	▲
Potassium hydroxide 10%	Sol.	5,10	●	Sol.	5,10	●	Sol.	5,10	●	Sol.	5,10	●	Sol.	10	❒		●	Sol.	5,10	❒	Sol.	5,10	▲
Potassium nitrate	Sol.	10	●	Sol.	10	●	Sol.	10	●	Sat.		●					●			●			●
Sea, river and drinkable water			●			●			●			●			●		●			●			●
Silicone oil			●			●			●			●								●			●
Silver nitrate			●	Sol.	10	●	Sol.	10	●	Sol.	20	●					●	Sol.		❒			
Soap solution	Sol.		●	Sol.		●	Sol.		●	Sol.		●			●		●	Sol.		●	Sol.		●
Sodium carbonate	Sol.	10	●			●			●	Sol.	Sat.	●			●		●	Sol.		●	Sol.		
Sodium chloride	Sol.	10	●	Sol.	25	●	Sol.	25	●	Sol.	Sat.	●			●		●	Sol.		●	Sol.		●
Sodium hypochlorite	Sol.		●			▲			▲	Sol.	20	●	Sol.	5	▲		●	Sol.	10	▲	Sol.	10	●
Sodium nitrate	Sol.	10	●	Sol.	10	●	Sol.	10	●	Sat.		●					●			●			●
Sodium silicate			●						●			●					●	Sol.		●	Sol.		●
Sodium sulphate	Sol.	10	●	Sol.	10	●	Sol.	10	●			●			●		●	Sol.		●	Sol.		●
Steam			●			●			●			●					●			❒			●
Sulphuric acid	Sol.	10	▲	Sol.	2	●	Sol.	2	●		98	●	Sol.	10	▲	Up to 60°C	●	Sol.	20	❒	Sol.	20	●
Tartaric acid			●	Sol.		❒	Sol.		❒	Sol.	10	●			●	Up to 60°C	●	Sol.		●	Sol.		●
Tetralin			●			●			●			▲					▲			▲			●
Toluol/toluene			●			●			●			❒			●		▲			▲			❒
Trichloroethylene			❒			●			●			▲					▲			▲			❒
Unleaded petrol			●			●			●	Swell.		❒			●		▲	Swell.		❒			●
Vaseline			●			●			●			●					❒			●			●
Vinegar												●					●			❒			❒
Whisky			●			❒			●			●			●		●			●			●
Wine			●			●			●			●			●		●			●			●
Xiyol			●			●			●			▲			●		▲			▲			●
Zinc chloride		10	❒	Sol.	50	●	Sol.	50	●	Sol.	20	●			●		●	Sol.		●	Sol.		●

● = good resistance
❒ = fair resistance (limited use according to working conditions)
▲ = poor resistance (should not be used)
Blanks stand for data not available

Conc. = concentration
Sol. = solution
Liq. = liquid
Sat. = saturated
Swell. = swelling

The characteristics described should be treated as guidelines only. No guarantee is made.
The user is responsible for checking the exact operating conditions.

MATERIAL PROPERTIES OF ELASTOMERS (rubber)

International symbol	NBR	CR	FKM - FPM	TPE	PUR
Brand name (e.g.)	Perbunan®	Neoprene®	Viton®	SANTOPRENE®	Bayflex®
Chemical name	Acrylonitrile-butadiene rubber	Chloroprene rubber	Fluorine rubber	Thermoplastic rubber	Polyurethane
Hardness (Shore A)	25 to 95	30 to 90	65 to 90	55 to 87	65 to 90
Temperature resistance					
short-term	-40° to +150°C	-30° to +150°C	-30° to +280°C	-40° to +150°C	-40° to +130°C
long-term	-30° to +120°C	-20° to +120°C	-20° to +230°C	-30° to +125°C	-25° to +100°C
Tensile strength [N/mm^2]	25	25	20	8.5	20
Wear Abrasion resistance	good	good	good	good	excellent
Resistance to:					
oil, grease	outstanding	good	good	good	very good
solvents	good in part	good in part	very good	outstanding	satisfactory
acids	restricted	good	very good	outstanding	not suitable
caustic solutions	good	very good	very good	outstanding	not suitable
fuels	good	slight	outstanding	good	good
general	NBR is a synthetic special rubber for rubber parts with high requirements for resistance to swelling when in contact with oils and fuels. Standard material for O-rings.	CR is one of the most frequently used synthetic rubbers with a wide range of applications for parts which require exceptional resistance to ageing, atmospheric and environmental influences.	FPM is unmatched for applications with contact to fuels, oils, solvents, as well as many acids and coustic solutions; resistant to atmospheric and environmental influences. Due to its high price its use is restricted to high quality rubber parts which are exposed to extremely heavy wear.	SANTOPRENE® is a thermoplastic rubber, the performance characteristics of which are comparable to those of many customary vulcanised special rubbers. SANTOPRENE® is a mult-purpose material with outstanding dynamic fatigue life and excellent resistance to ozone and atmospheric influences (environmental influences).	PUR is known for exceptionally good mechanical characteristics with very good resistance to atmospheric and environmental influences. In addition, the extreme resistance to tearing and to wear, should also be mentioned.

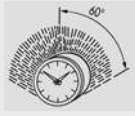
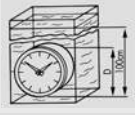
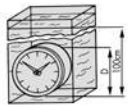
The characteristics described should be treated as guidelines only. No guarantee is made. The exact conditions of use have to be taken into account individually.

Perbunan® and Bayflex® are registered trade-marks of Bayer. - Viton® is a registered trade-mark of DuPont Dow Elastomer.
Neoprene® is a registered trade-mark of DuPont SBR. - SANTOPRENE® is a registered trade-mark of Advanced Elastomer Systems.

IP PROTECTION CLASSIFICATION FOR CASES according to International Standard IEC 529

1st digit Protection against intrusion of solid foreign bodies.		
0		No protection.
1		Protection against intrusion of solid foreign bodies, Ø larger than 50 mm (hands).
2		Protection against intrusion of solid foreign bodies, Ø larger than 12 mm (fingers).
3		Protection against intrusion of solid foreign bodies, Ø larger than 2.5 mm (tools, wires).
4		Protection against intrusion of solid foreign bodies, Ø larger than 1 mm (wires).
5		Protection against harmful deposits of dust, which damage the correct operation.
6		Complete protection against intrusion of durst.

As a specification for cases of rotary controls does not exist, we refer to International Standard IEC 529 for protection classifi cation of cases for electrical machines, devices or materials.

2nd digit Protection against penetration of liquids.		
0		No protection.
1		Protection against drops of condensed water falling vertically.
2		Protection against drops of liquid falling at an angle equal to or smaller than 15° with respect to the vertical.
3		Protection against drops of liquid falling at an angle equal to or smaller than 60° with respect to the vertical.
4		Protection against liquid splashed from any direction.
5		Protection against water jets projected by a nozzle from any direction.
6		Protection against water from heavy sea on ship's decks.
7		Protection against immersion in water under stated conditions of pressure and time.
8		Protection against indefinite immersion in water under stated conditions of pressure.

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