HYDROTECHNIK

Section 1

MINIMESS® Test points & adaptors

MINIMESS® Gas charging valves, kits & accessories

Microbore Hose, assemblies & accessories

Pressure gauges & accessories

MINIMESS® pressure gauge test kits

Fixed sensors, switches & displays

HYDROTECHNIK

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Digital test & datalogging equipment

Software

Measuring Sensors, Adaptors & Accessories

Introduction

Minimess® The original and still a market leader
Minimess test points offer uniquely simple method of accessing to low or high pressure systems for the purpose of pressure testing, oil sampling or gas charging. Developed by Hydrotechnik more than 50 years ago, they are found worldwide in hydraulic, process and gas systems. Minimess pressure test points offer the most advanced sealing system available with working pressures up to 630 bar. A life-time leak free guarantee and suitability with almost any fluid or gas makes Minimess the most versatile test point available.

Applications

- Hydraulic Testing Points
- Gas Testing
- Gas Charging Valves
- Bleeding Points
- Oil Sampling Points

When installed in a live system Minimess test points provide an ideal way to obtain random pressure or temperature checks during servicing or fault finding. Test hoses, gauges or sensors can be connected or disconnected under full system pressure without loss of system pressure, media loss or dirt ingress.

One product
Many applications

Lifetime leak-free guarantee

Leak free design
Advances in the requirements for leakproof hydraulic systems led Hydrotechnik to design a positive 'O' ring and poppet seal design. This has also enabled the product to be used with gases as well as fluids. Traditional test points have a metal to metal ball bearing seal that can give rise to leakage of fluids and one not suitable for gas applications.

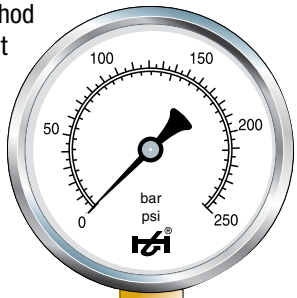
Reliability and quality
Minimess test points are manufactured to the highest standards using the latest automated assembly technology with auto in leak testing to ensure all products are guaranteed.

Minimess is used by globally recognised brands as a trusted method of connecting test gauges - transducers etc or for test and fault finding. Millions are sold each year to a multitude of industries.

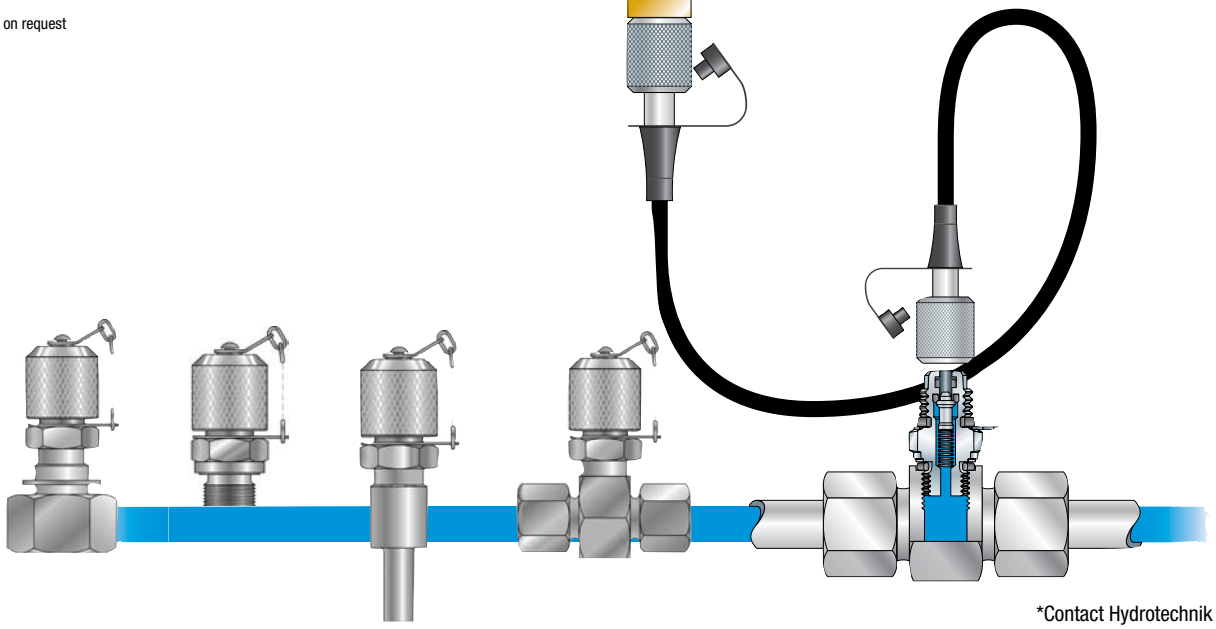
Material options

- Zinc Nickel plated carbon steel (chrome VI free)
- Stainless steel
- Brass
- Monel

other materials available on request



Approved for domestic gas installations



*Contact Hydrotechnik

Test point series overview

1620

M16x2 Minimess pressure test points

Screw-cap thread	Nominal Bore	Max Pressure	Material	Sealing material
M 16 x 2	DN 2	630 Bar	Free-cutting steel 1.0718	NBR (Perbunan)
M 16 x 2	DN 2	630 Bar	Stainless steel 1.4571	FKM (Viton)

p/t 1620

M16x2 Minimess pressure and temperature test points

Screw-cap thread	Nominal Bore	Max Pressure	Material	Sealing material
M 16 x 2	DN 2	630 Bar	Free-cutting steel 1.0718	NBR (Perbunan)
M 16 x 2	DN 2	630 Bar	Stainless steel 1.4571	FKM (Viton)

Simultaneous connection for pressure and temperature testing.

1215

M12x1.5 Minimess pressure test points

Screw-cap thread	Nominal Bore	Max Pressure	Material	Sealing material
Fixing thread 12	DN 2	630 Bar	Free-cutting steel 1.0718	NBR (Perbunan)
Fixing thread 12	DN 2	630 Bar	Stainless steel 1.4571	FKM (Viton)

1615

M16x1.5 Minimess pressure test points

Screw-cap thread	Nominal Bore	Max Pressure	Material	Sealing material
M 16 x 1.5	DN 2	630 Bar	Free-cutting steel 1.0718	NBR (Perbunan)
M 16 x 1.5	DN 2	630 Bar	Stainless steel 1.4571	FKM (Viton)

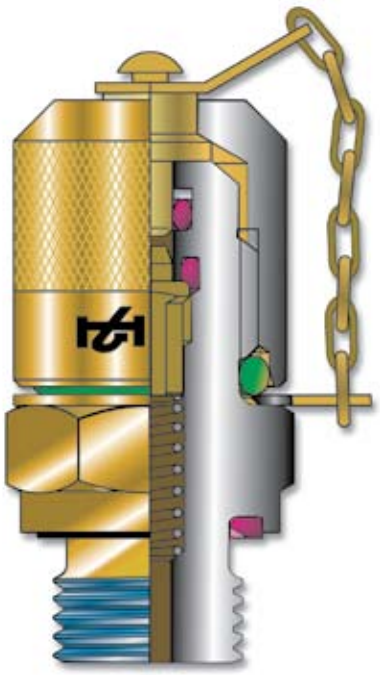
1604

M16 style larger bore (4mm) Minimess pressure test points

Screw-cap thread	Nominal Bore	Max Pressure	Material	Sealing material
Fixing thread 16	DN 4	400 Bar	Free-cutting steel 1.0718	NBR (Perbunan)
Fixing thread 16	DN 4	400 Bar	Stainless steel 1.4571	FKM (Viton)

Minimess Test Point Technical Data

Max. working pressure 63 Mpa (630 bar) according to ISO 15171-2



Material
Coupling body and metal cap made of steel 1.0718
NOTE: UNLESS STATED OTHERWISE, ALL PRODUCTS SHOWN IN THIS CATALOGUE ARE MADE OF FREE-CUTTING STEEL 1.0718.

Sealing ●
Internal primary and secondary sealing as well as sealing for screw-in threads are made of NBR (Perbunan). Option in FKM (Viton). EDM available on request

Vibration ●
NBR (Perbunan) and/or FKM (Viton) O-ring to prevent cap loosening due to vibration.

Screw-in thread ●
Large range of threads are available.

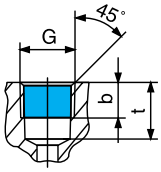
Media application
Suitable for hydraulic- and other oils of a mineral oil basis.

Temperature ranges for applications with metal cap (standard)
Sealing made of NBR (Perbunan): -25°C to +100°C, for a short time, can be also used up to +120°C

Sealing made of FKM (Viton) is an option: -20°C to +200°C
Application with plastic cap (option) and for both sealing materials: -20°C to +100°C

Thread form data

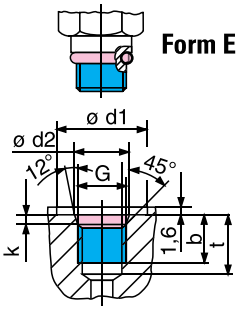
Form C



Thread port according to DIN 3852 part 1 and part 2, form Z (sealed with suitable sealant)

G	b	t
ISO 7 / I - R1/8	5.5	9.5
ISO 7 / I - R1/4	8.5	13.5

Form E



Thread port according to SAEJ 514 (UNF) or according to ISO 6149-1 (sealed with O-ring)

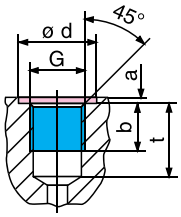
SAE J 514 (UNF)

G	d_1	d_2	b	k	t	a	z°
7/16-20 UNF	21.0	12.4	11.5	2.4	14.0	1.6	12.0
1/2-20 UNF	23.0	14.0	11.5	2.4	14.0	1.6	12.0
9/16-18 UNF	25.0	15.6	12.7	2.5	15.5	1.6	12.0
3/4-16 UNF	30.0	20.6	14.3	2.5	17.5	2.4	12.0

ISO 6149-1

G	d_1	d_2	b	k	t	a	z°
M 10 x 1	19.0	11.1	10.0	1.6	11.5	1.0	12.0
M 12 x 1.5	19.0	13.8	11.5	2.4	14.0	1.5	15.0
M 14 x 1.5	21.0	15.8	11.5	2.4	14.0	1.5	15.0
M 16 x 1.5	24.0	17.8	13.0	2.4	15.5	1.5	15.0

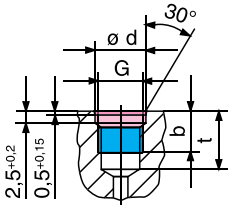
Form F



Thread Port up to Ø d according to DIN 3852 part 1 and part 2, from X (sealed with flat seal)

G	d	a	b	t
ISO 228-G 1/8	15.0	1.0	8.0	13.0
ISO 228-G 1/4	20.0	1.5	12.0	18.5
ISO 228-G 3/8	23.0	2.0	12.0	18.5
ISO 228-G 1/2	27.0	2.5	14.0	22.0
M 12 x 1.5	18.0	1.5	12.0	18.5
M 14 x 1.5	20.0	1.5	12.0	18.5
M 16 x 1.5	22.0	1.5	12.0	18.5

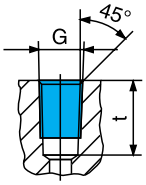
Form G



Thread Port according to HYDROTECHNIK standard N901-01-14 (sealed with O-ring)

G	d	b	t
M 8 x 1	9.5	9.0	13.0
M 10 x 1	11.5	9.0	13.0

Form H



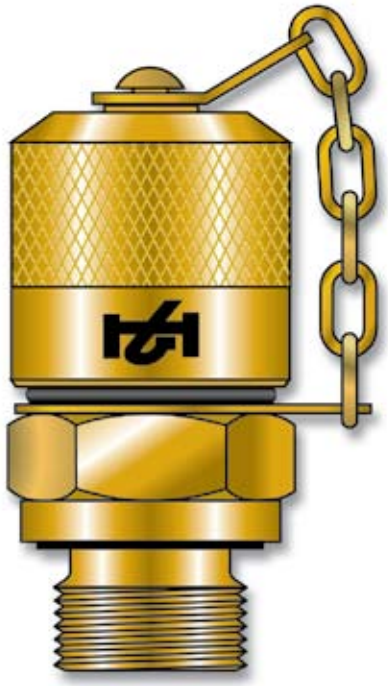
Thread Port according to ANSI/ASME B 1.20.1-1983 (self sealing thread)

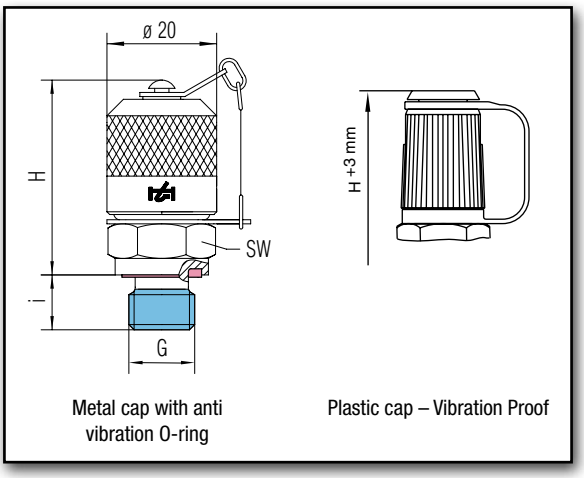
G	t
1/8 NPTF	12.0
1/4 NPTF	17.5
1/2 NPTF	22.9

1620 Minimess Test Points

MINIMESS® 1620 or 'Test 20' is the most commonly used test point across all industries.
The wide choice of materials and connection threads make this the most versatile range available

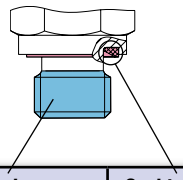
Lifetime leak-free guarantee

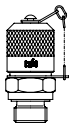
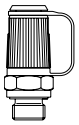




Metal cap with anti vibration O-ring

Plastic cap – Vibration Proof



							Free cutting steel 1.0718  Metal cap	Free cutting steel 1.0718  Plastic cap	Stainless steel 1.4571  Metal cap
Thread G	**Seal type A**	**Torque Nm**	**p max Bar**	**H mm**	**i mm**	**SW mm**	**Part number with NBR – sealing**	**Part number with NBR – sealing**	**Part number with FKM – sealing**
M 8 x 1*	Form G	6	250	41	8.5	17	2103-01-32.00	2103-30-32.00	on request
M 10 x 1	Form G	12	630	37.5	8.5	17	2103-01-33.00	2103-30-33.00	2703-01-33.10
M 12 x 1.5	Form F	30	630	36	10	17	2103-01-13.00	2103-30-13.00	on request
M 14 x 1.5	Form F	40	630	36	10	19	2103-01-14.00	2103-30-14.00	2703-01-14.10
M 16 x 1.5	Form F	60	630	36	10	22	2103-01-15.00	2103-30-15.00	on request
M 14 x 1.5	Form E*	45	630	35.5	11	19	2103-01-96.00	2103-30-96.00	on request
ISO 228-G 1/8	Form F	18	400	38	8	17	2103-01-17.00	2103-30-17.00	2703-01-17.10
ISO 228-G 1/4	Form F	40	630	36	10	19	2103-01-18.00	2103-30-18.00	2703-01-18.10
ISO 228-G 3/8	Form F	60	630	36	10	22	2103-01-16.00	2103-30-16.00	on request
1/8 NPTF	Form H	-	400	33	9.5	17	2103-01-46.00	2103-30-46.00	on request
1/4 NPTF	Form H	-	630	33	16.5	17	2103-01-47.00	2103-30-47.00	2703-01-47.10
7/16-20 UNF	Form E	20	630	37	9	17	2103-01-21.00	2103-30-21.00	on request
9/16-18 UNF	Form E	35	630	36	10	19	2103-01-53.00	2103-30-53.00	on request
ISO 7/I-R 1/8	Form C	-	400	33	13	17	2103-01-40.00	2103-30-40.00	on request
ISO 7/I-R 1/4	Form C	-	630	33	13	17	2103-01-41.00	2103-30-41.00	on request

Option

For sealing in FKM (Viton) Exchange end digits from 00 to 10

Other materials, designs, sealing and screw-in threads on request.
We reserve the right to carry out technical modifications.

* M8x1 – Please do not use for new machinery design.
** Form E – ISO 6149-2.

Male swivel female inline adaptors c/w 1620 test point

In-line MINIMESS® male x swivel female pressure test point adaptors are a simple and easy method of adding test points into a system. Suitable for OEM build or retro–fitting to existing systems, between hose joints or manifold and hose. Special configurations are available for OEM applications.

BSP Parallel male x swivel female (60° cone sealing) test point adaptor c/w 1620 Minimess™ test point fitted

stainless steel

A (BSP size)	L(mm)	A/F(mm)	Part number (Carbon Steel)	Part number (Stainless Steel)
1/4"	48	25.4	SNA01	SNA01-SS
3/8"	54	25.4	SNA02	SNA02-SS
1/2"	58	27	SNA03	SNA03-SS
3/4"	64	27	SNA04	SNA04-SS
5/8"	63	30	SNA05	on request
1"	74	41	SNA06	SNA06-SS
1.1/4"	74	50	SNA07	on request
1.1/2"	82	55	SNA08	on request

Also available with 1215 & 1615 test points fitted e.g for 1215 series test point fitted to SNA01 - order as SNA01-1215.

JIC male x swivel female (37° cone sealing) test point adaptor c/w 1620 Minimess™ test point fitted

A	L(mm)	A/F(mm)	Part number
7/16"-20 UNF	53	25.4	SNA55
1/2"-20 UNF	53	25.4	SNA56
9/16"–18 UNF	55	25.4	SNA57
3/4"–16 UNF	60	32	SNA58
7/8"–14 UNF	64	25.4	SNA59
1.1/16"–12 UNF	70	32	SNA60
1.5/16"–12 UNF	74	38.1	SNA61
1.5/8"–12 UNF	78	50.8	SNA62
1.7/8"–12 UNF	85	55	SNA63

Also available with 1215 & 1615 test points fitted e.g for 1215 series test point fitted to SNA55 - order as SNA55-1215.

Male x swivel female inline adaptors c/w 1620 test point

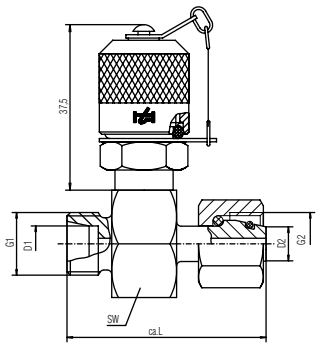
ORFS male x swivel female (O-ring face sealing) test point adaptor c/w 1620 Minimess™ test point fitted

A	L(mm)	A/F(mm)	Part number
9/16"-18 UNF	47.55	25.4	SNA70
11/16"-16 UNF	50-60	25.4	SNA71
13/16"-16 UNF	56-66	25.4	SNA72
1"-14 UNF	61-74	28.6	SNA73
1.3/16-12 UNF	65-74	35	SNA74
1.7/16-12 UNF	67-80	41	SNA75

Also available with 1215 & 1615 test points fitted e.g for 1215 series test point fitted to SNA01 - order as SNA01-1215.

Metric DKO 1620 Male x swivel female Tee Adaptors

For solder free screw-in pipe connections according to DIN 2353



Series	p max Bar	G1 mm	D1	G2 mm	D2 mm	SW mm	L mm	Part number
L 6	315	M 12 x 1.5	6	M 12 x 1.5	14	24	44.5	2103-KL-06.00
L 8	315	M 14 x 1.5	8	M 14 x 1.5	17	24	44.5	2103-KL-08.00
L 10	315	M 16 x 1.5	10	M 16 x 1.5	19	24	47.5	2103-KL-10.00
L 12	315	M 18 x 1.5	12	M 18 x 1.5	22	24	48.5	2103-KL-12.00
L 15	315	M 22 x 1.5	15	M 22 x 1.5	27	30	51.5	2103-KL-15.00
L 18	315	M 26 x 1.5	18	M 26 x 1.5	32	32	55.5	2103-KL-18.00
L 22	160	M 30 x 2	22	M 30 x 2	36	36	58.5	2103-KL-22.00
L 28	160	M 36 x 2	28	M 36 x 2	41	41	59	2103-KL-28.00
L 35	160	M 45 x 2	35	M 45 x 2	50	46	68	2103-KL-35.00
L 42	160	M 52 x 2	42	M 52 x 2	60	55	68	2103-KL-42.00
S 6	630	M 14 x 1.5	6	M 14 x 1.5	6	24	46.5	2103-KS-06.00
S 8	630	M 16 x 1.5	8	M 16 x 1.5	8	24	48.5	2103-KS-08.00
S 10	630	M 18 x 1.5	10	M 18 x 1.5	10	24	49.5	2103-KS-10.00
S 12	630	M 20 x 1.5	12	M 20 x 1.5	12	24	50	2103-KS-12.00
S 14	630	M 22 x 1.5	14	M 22 x 1.5	14	27	53.5	2103-KS-14.00
S 16	400	M 24 x 1.5	16	M 24 x 1.5	16	30	56.5	2103-KS-16.00
S 20	400	M 30 x 2	20	M 30 x 2	20	36	64.5	2103-KS-20.00
S 25	400	M 36 x 2	25	M 36 x 2	25	41	66	2103-KS-25.00

Metric DKO (24° sealing cone) standpipe & compression tee adaptors

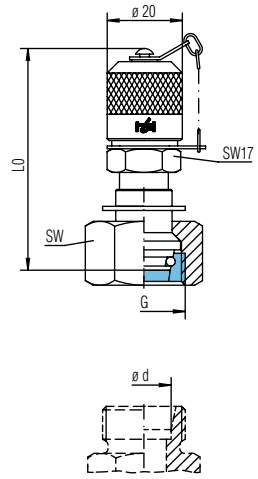


Fig.1

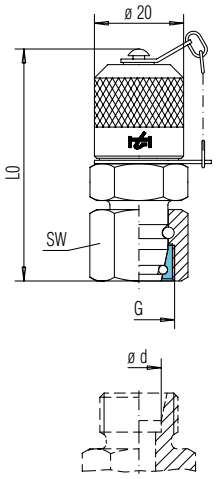
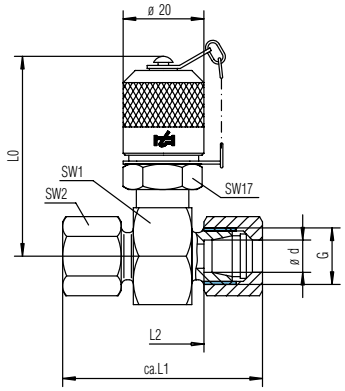


Fig.2

DKO - measuring connection with 24° sealing cone and Test Points incorporated. Elastic Perbunban O-ring at the sealing cone.



Tee adapter c/w cutting rings with union nuts. Test Points incorporated.

DKO Female

Series	p max Bar	Thread G	Fig.	LO mm	SW mm	Part number
L 6	315	M 12 x 1.5	1	52	14	2103-93-06.00
L 8	315	M 14 x 1.5	1	52	17	2103-93-08.00
L 10	315	M 16 x 1.5	1	52	19	2103-93-10.00
L 12	315	M 18 x 1.5	1	52	22	2103-93-12.00
L 15	315	M 22 x 1.5	1	52	27	2103-93-15.00
L 18	315	M 26 x 1.5	1	52	32	2103-93-18.00
L 22	160	M 30 x 2	2	60	36	2103-40-22.00
L 28	160	M 36 x 2	2	61	41	2103-40-28.00
L 35	160	M 45 x 2	2	63	50	2103-40-35.00
L 42	160	M 52 x 2	2	63	60	2103-40-42.00
S 6	630	M 14 x 1.5	1	52	17	2103-94-06.00
S 8	630	M 16 x 1.5	1	52	19	2103-94-08.00
S 10	630	M 18 x 1.5	1	52	22	2103-94-10.00
S 12	630	M 20 x 1.5	1	52	24	2103-94-12.00
S 14	630	M 22 x 1.5	2	63	27	2103-41-14.00
S 16	400	M 24 x 1.5	1	52	30	2103-94-16.00
S 20	400	M 30 x 2	2	63	36	2103-41-20.00
S 25	400	M 36 x 2	2	64.5	46	2103-41-25.00
S 30	400	M 42 x 2	2 L6	66	50	2103-41-30.00
S 38	315	M 52 x 2	2	69	60	2103-41-38.00

Metric Tee

L1	L2 Bar	LO mm	SW1 mm	SW2 mm	Part number
50.5	20.5	49.5	24	14	2103-11-06.00
50.5	20.5	49.5	24	17	2103-11-08.00
52.5	22.5	49.5	24	19	2103-11-10.00
52.5	22.5	49.5	24	22	2103-11-12.00
54.5	24.5	52.5	30	27	2103-11-15.00
56.5	23.5	53.5	32	32	2103-11-18.00
60.5	27.5	55.5	36	36	2103-11-22.00
60.5	27.5	58	41	41	2103-11-28.00
68.5	25.5	60.5	46	50	2103-11-35.00
70.5	24.5	65	55	60	2103-11-42.00
54.5	24.5	49.5	24	17	2103-12-06.00
54.5	24.5	49.5	24	19	2103-12-08.00
56.5	23.5	49.5	24	22	2103-12-10.00
56.5	23.5	49.5	24	24	2103-12-12.00
62.5	26.5	51	27	27	2103-12-15.00
62.5	25.5	52.5	30	30	2103-12-18.00
68.5	25.5	55.5	36	36	2103-12-22.00
74.5	26.5	58	41	46	2103-12-28.00
80.5	27.5	60.5	46	50	2103-12-35.00
91	29	65	55	60	2103-12-42.00

Options

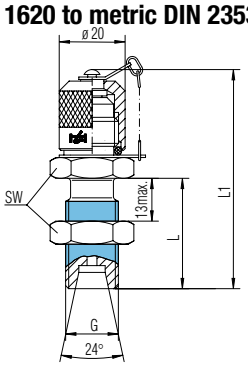
All sealing made of Viton with metal cap (when ordering, exchange end digits from 00 to 10) — 10

With mounted plastic cap (when ordering, exchange end digits from 00 to 90) — 90

All sealing made of Viton with plastic cap (when ordering, exchange end digits from 00 to 95) — 95

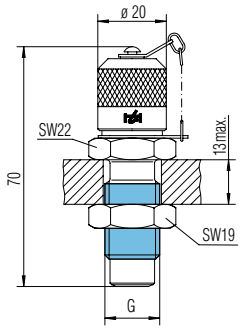
1620 bulkhead & gauge adaptors

1620 to metric DIN 2353 bulkhead adaptors



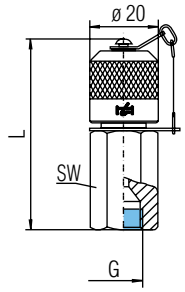
Thread G2	p max Bar	Connection	L mm	L1 mm	SW mm	Part number
M 12 x 1.5	315	L6	34	67	17	2103-04-22.00
M 14 x 1.5	315	L8	34	67	19	2103-04-23.00
M 16 x 1.5	315	L10	33.5	66.5	22	2103-04-18.00
M 14 x 1.5	630	S6	36	69	19	2103-04-24.00
M 16 x 1.5	630	S8	33.5	66.5	22	2103-04-25.00
M 18 x 1.5	630	S10	37	70	24	2103-04-26.00

1620 Male/Male bulkhead adaptor



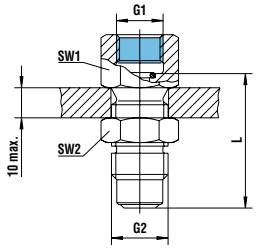
Thread G2	p max Bar	Connection	Part number
M 16 x 2	630	Both sides for Minimess 1620 (M 16 x 2)	2103-04-16.00

1620 standpipe adaptor to JIC female 37° cone seal



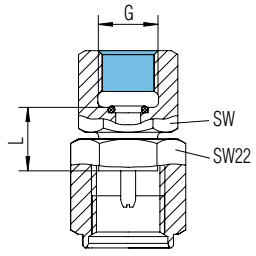
Thread G2	p max Bar	Pipe Ø mm	Pipe Ø inches	L mm	SW mm	Part number
7/16-20 UNF	600	6	1/4	55	17	2103-85-21.00
1/2-20 UNF	420	8	5/16	56.5	17	2103-85-22.00
9/16-18 UNF	315	10	3/8	57.5	19	2103-85-23.00
3/4-16 UNF	315	12	1/2	60.5	22	2103-85-24.00

1620 to pressure gauge connection for bulkhead fitting



Internal thread G1	p max Bar	Connection G2	L mm	SW mm	Note	Part number
ISO 228-G 1/4	630	1620 / M 16 x 2	38	19	Without return valve	2103-05-11.00
ISO 228-G 1/2	630	1620 / M 16 x 2	42.5	27	Without return valve	2103-05-12.00
1/4 NPT	630	1620 / M 16 x 2	-	19	Without return valve	2103-05-23.00

1620 to pressure gauge – direct connection



Internal thread G1	p max Bar	L mm	SW mm	Part number
ISO 228-G 1/4	630	14.5	19	2103-07-11.62
ISO 228-G 1/2	630	17	27	2103-07-12.62
1/4 NPT	630	-	19	2103-07-23.62

1620 sensor, hose 90° & changeover adaptors

1620 to pressure sensor direct connectors

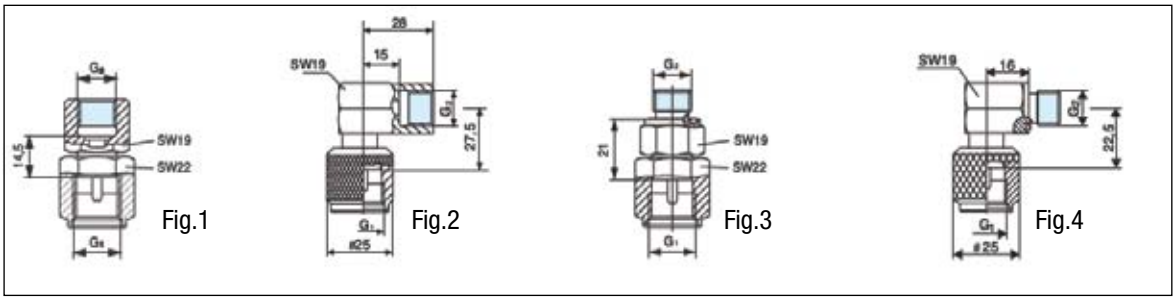
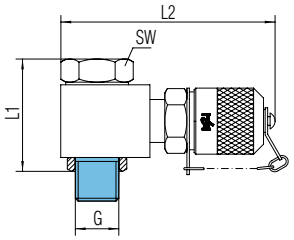


Fig.	Sensor thread for sensor G2	Form	thread G1	p max		Part-Number
1	ISO 228-G1/4 internal thread		MINIMESS® 1620 M 16x2	630 bar (9000 psi)	straight	2103-07-18.62
2					90° angle	2146-13-05.00
3	ISO 228-G1/4 external thread	F			straight	2103-07-41.62
4					90° angle	2146-54-19.40

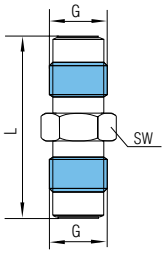
1620 to G ¼" BSP male 90° swivel adaptor



Internal thread G1	p max Bar	L1 mm	L2 mm	SW mm	Part number
ISO 228-G 1/4	630	34.5	64.5	19	2115-22-34.00

Sealing on screw-in thread (hollow screw) via dka-ring, on hexagon via Gi-ring (NBR).
Other options on request

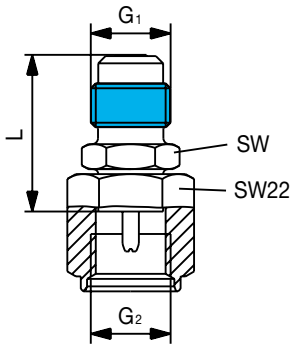
1620 male/male hose adaptor



Internal thread G1	p max Bar	L1 mm	SW mm	Note	Part number
M 16 x 2	630	42	17	Without return valve	2146-01-00.00

Minimess test thread changeover adaptors

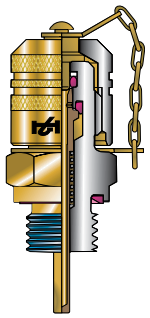
Adaptor for connection or change-over to various series such as 1620, 1615, 1215

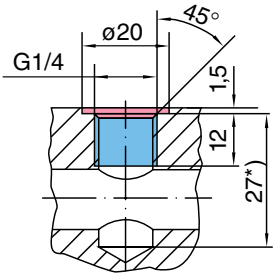


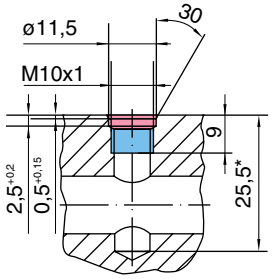
Thread G1	Thread G2	L mm	SW mm	Part number
M 12 x 1.5	M 16 x 2	25.2	17	2103-07-42.62
M 16 x 2	M 12 x 1.5	32	17	2101-07-44.62
M 16 x 1.5	M 16 x 2	31.4	17	2103-07-43.62
M 16 x 2	M 18 x 1.5	31.4	17	2102-07-44.62
5/8" BSF (HSP)	1620			HSPF/1620(M)

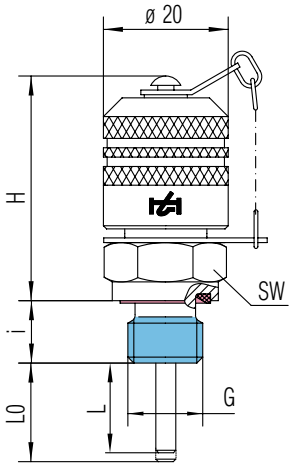
1620 p/T (pressure & temperature) test points

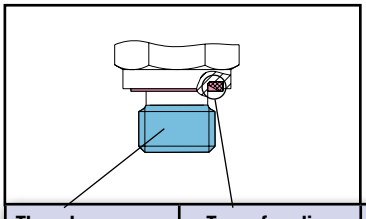
For pressure and temperature measurement











Free cutting steel 1.0718

Metal cap

Thread G	Type of sealing A	Torque Nm	p max mm	H mm	i mm	L0 mm	L mm	SW mm	Part number with NBR sealing
ISO 228-G 1/4	Form F	40	630	36.5	10	16	14.5	19	2149-04-15.13
M 10 x 1	Form G	12	630	38	8.5	16	14.5	17	2149-04-19.13

L0 = max. immersion depth in coupled state, L = not coupled state

Option

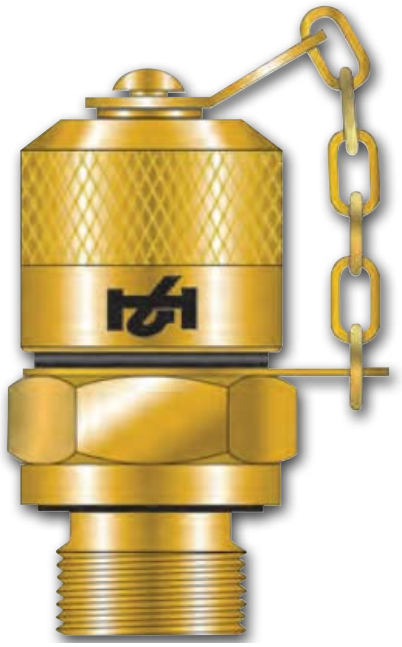
For FKM (Viton) - exchange end digits from 13 to 53	53
For EPDM - exchange and digital from 13 to 43	43

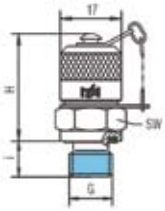
Other materials, further options, sealing and screw-in threads on request.
We reserve the right to carry out technical modifications.

1215 Minimess test points

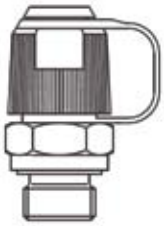
MINIMESS® 1215 or 'Test 15' is commonly used in the construction and gas industries. Small and compact in design with a 12mm threaded cap, the 1215 test point is capable of a 630 bar working pressure. The 1215 is available in many materials including Steel, Stainless Steel and Brass.

Lifetime leak-free guarantee

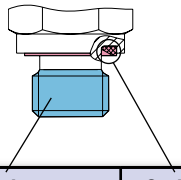




Metal cap with anti vibration O-ring



Plastic cap with integrated safety device against vibration



							Free cutting steel 1.0718  Metal cap	Free cutting steel 1.0718  Plastic cap	Stainless steel 1.4571  Metal cap
Thread G	**Seal type A**	**Torque Nm**	**p max mm**	**H mm**	**i mm**	**SW mm**	**Part number with NBR sealing**	**Part number with NBR sealing**	**Part number with FKM sealing**
M 8 x 1*	Form G	6	250	30	8.5	14	2101-06-32.00	2101-01-32.00	on request
M 10 x 1	Form G	12	630	30	8.5	14	2101-06-33.00	2101-01-33.00	2701-06-33.10
M 12 x 1.5	Form F	30	630	29	10	17	2101-06-13.00	2101-01-13.00	on request
M 14 x 1.5	Form F	40	630	29	10	19	2101-06-14.00	2101-01-14.00	on request
ISO 228-G 1/8	Form F	18	400	30	8	14	2101-06-17.00	2101-01-17.00	on request
ISO 228-G 1/4	Form F	40	630	29	10	19	2101-06-18.00	2101-01-18.00	2701-06-18.10
1/8 NPTF	Form H	-	400	26	12	14	2101-06-46.00	2101-01-46.00	on request
1/4 NPTF	Form H	-	630	26	15	14	2101-06-47.00	2101-01-47.00	2701-06-47.10
7/16 - 20 UNF	Form E	20	630	29	9	17	2101-06-21.00	2101-01-21.00	on request
9/16 - 18 UNF	Form E	35	630	28	10	19	2101-06-53.00	2101-01-53.00	on request
ISO 7/l-R 1/8	Form C	-	400	26	12	14	2101-06-40.00	2101-01-40.00	on request

Option

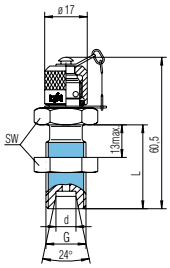
For sealing in FKM (Viton) Exchange end digits from 00 to 10

Other materials, designs, sealing and screw-in threads on request.
We reserve the right to carry out technical modifications.

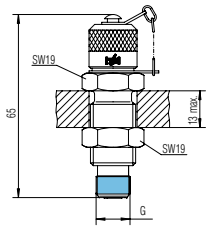
* M8x1 – Please do not use for new machinery design
** Form E – ISO 6149-2

1215 bulkhead, gauge & other adaptors

For solder free screw-in pipe connections according to DIN 2353; execution free-cutting steel 1.0718; sealing NBR

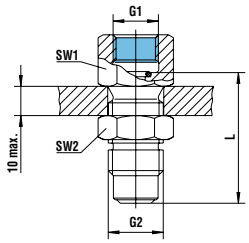


Thread G	p max mm	Connection	L mm	L1 mm	SW mm	Part number
M 12 x 1.5	315	L 6	34	60.5	17	2101-04-22.90
M 14 x 1.5	315	L 8	34	60.5	19	2101-04-23.90
M 14 x 1.5	630	S 6	36	62.5	19	2101-04-24.90



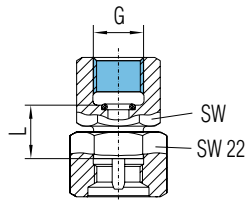
Thread G	p max mm	Connection	Part number
Fixing thread 12	630	On both sides Minimess® - 1215 connection	2101-04-16.90

Pressure gauge connection for bulkhead fitting



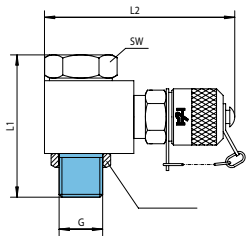
Thread G1	p max mm	Connection G2	L mm (approx)	SW mm	Note	Part number
ISO 228-G 1/4	630	1215	31	19	Without return valve	2101-05-11.00
ISO 228-G 1/2	630	1215	38.5	27	Without return valve	2101-05-12.00
1/4 NPT	630	1215	-	22	Without return valve	2101-05-23.00

Pressure gauge – direct connection



Internal thread G1	p max Bar	L mm	SW mm	Part number
ISO 228-G 1/4	630	14.5	19	2101-07-11.62
ISO 228-G 1/2	630	17	27	2101-07-12.62
1/4 NPT	630	-	22	2101-07-23.62

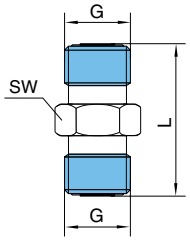
90° Swivel screw connection



Thread G1	p max Bar	L1 mm	L2 mm	SW mm	Part number
ISO 228-G 1/4	630	34.5	46	19	2115-22-13.00

Sealing on screw-in thread (hollow screw) via dka-ring, on hexagon via Gi-ring (NBR). Other options on request.

Hose adaptors



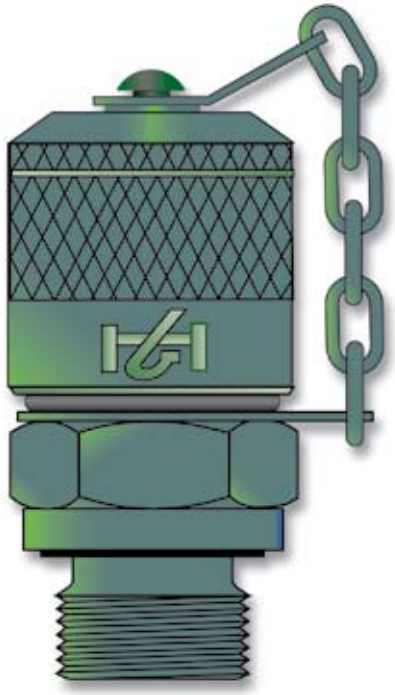
Thread G1	p max Bar	L1 mm	SW mm	Note	Part number
ISO 228-G 1/4	630	29	14	Without return valve	2146-20-00.20

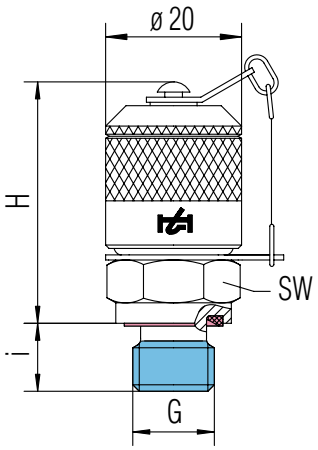
Other materials, further options, sealing and screw-in threads on request.

1615 Minimess test points

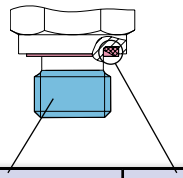
MINIMESS® 1615 or 'Test 15' coupling is used most commonly in the defence, gas and marine industries. The 1615 has a green finish and has an M16 connection thread. Materials available are Steel, Stainless Steel or Monel.

Lifetime leak-free guarantee





Metal cap with anti vibration O-ring



Thread G	Seal type A	Torque Nm	p max Bar	H mm	i mm	SW mm	Free cutting steel 1.0718 Metal cap Part number with NBR sealing	Stainless steel 1.4571 Metal cap Part number with FKM sealing
M 10 x 1	Form G	12	630	37.5	8.5	17	2102-01-33.00	2702-01-33.10
M 12 x 1.5	Form F	30	630	36	10	17	2102-01-13.00	on request
M 14 x 1.5	Form F	40	630	36	10	19	2102-01-14.00	on request
M 16 x 1.5	Form B	60	630	36	10	19	2102-01-50.00	on request
ISO 228-G 1/4	Form F	40	630	36	10	19	2102-01-18.00	2702-01-18.10
1/4 NPTF	Form H	-	630	33	16.5	17	2102-01-47.00	on request

Option

For sealing in FKM (Viton) Exchange end digits from 00 to 10

Other materials, designs, sealing and screw-in threads on request.
We reserve the right to carry out technical modifications.

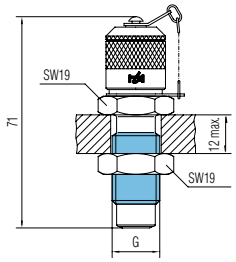
Specialised Options

Thread G	Type of sealing A	p max Bar	H mm	L mm	SW mm	Execution all sealing made of Viton	Part number
M 14 x 1.5	Gi-ring	63 MPa	36	12	19	With anti-vibration O-ring, alternative housing length	2702-01-14.48
M 14 x 1.5	Gi-ring		36	12	19	WIth sintered bronze filter	2702-72-14.10

Other materials, further options, sealing and screw-in threads on request.
We reserve the right to carry out technical modifications.

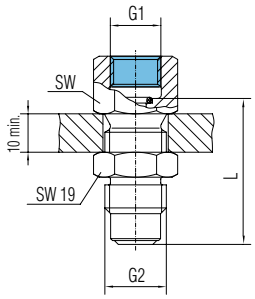
1615 bulkhead, gauge & other adaptors

1615 male/male bulkhead adaptor



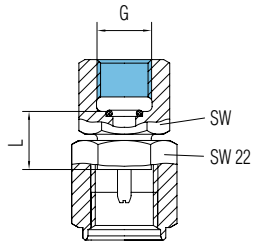
Thread (G) G	p max Bar	Connection	Part number
16 x 1.5	630	On both sides for series 1615	2102-04-01.00

Pressure gauge connection for bulkhead fitting



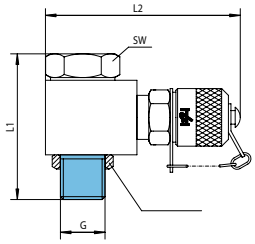
Thread (G) G	p max Bar	Connection	L mm	SW mm	Note	Part number
ISO 228-G 1/4	630	1615 / M 16 x 1.5	38	19	Without return valve	2102-05-11.00
ISO 228-G 1/2	630	1615 / M 16 x 1.5	42.5	27	Without return valve	2102-05-12.00

Pressure gauge – direct connection



Internal thread G	p max Bar	L mm	SW mm	Part number
ISO 228-G 1/4	630	14.5	19	2102-07-11.62
ISO 228-G 1/2	630	17	27	2102-07-12.62
1/4 NPT	630	-	19	2102-07-23.62

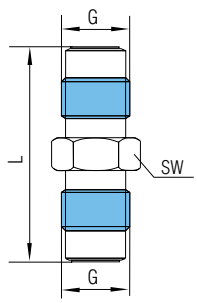
90° Swivel screw connection



Thread G	p max Bar	L1 mm	L2 mm	SW mm	Part number
ISO 228-G 1/4	630	43	69.5	19	2115-22-24.00

Sealing on screw-in thread (hollow screw) via dka-ring, on hexagon via Gi-ring (NBR).
Other options on request.

Hose adaptors



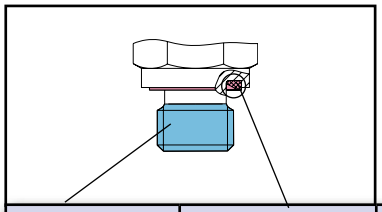
Thread G	p max Bar	L mm	SW mm	Note	Part number
M 16 x 1.5	630	42	17	Without return valve	2146-10-00.00

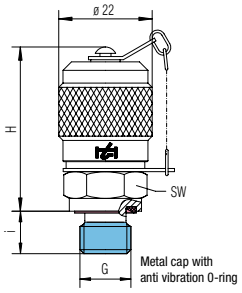
Other materials, further options, sealing and screw-in threads on request.

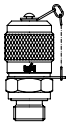
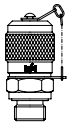
1604, Steck & HSP test points

1604 Minimess test points - 4mm nom. bore - M16 buttress thread

For use with viscous fluids e.g. gear oils or for quicker flow requirements





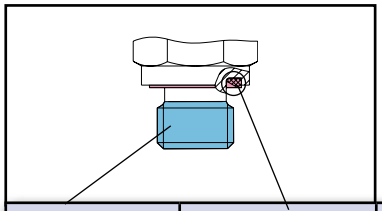
Free cutting steel 1.0718	Stainless steel 1.4571
 Metal cap	 Metal cap

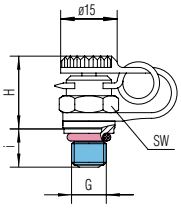
Thread G	Type of sealing A	Torque Nm	p max Bar	H mm	i mm	SW mm	Part number with NBR sealing	Part number with NBR sealing
M 10 x 1	Form G	12	400	43	8.5	17	2106-01-33.00	on request
M 14 x 1.5	Form F	40	400	40	10	17	2106-01-14.00	on request
ISO 228-G 1/4	Form F	40	400	40	10	19	2106-01-18.00	2706-01-18.10

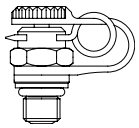
Option

For FKM (Viton) exchange end digits from 00 to 10

Plug-in test (steck) points – internal ball sealing





Free cutting steel 1.0718
 Metal cap

Thread G	Type of sealing A	Torque Nm	p max Bar	H mm	i mm	SW mm	Part number with NBR sealing
M 8 x 1	Form G	6	400	17.5	8.5	12	2104-30-32.00
M 10 x 1	Form G	12	400	17.5	8.5	12	2104-30-33.00
ISO7/I-R 1/8	Suitable sealant	-	400	17.5	8.5	12	2104-30-40.00
1/8 NPT	Suitable sealant	-	400	17.5	8.5	12	2104-30-43.00

HSP style test points (5/8" BSF cap thread)

HSP Test Points

Thread	Part number
1/8" BSP	2107-01-17.00
1/4" BSP	2107-01-18.00

Gauge adaptors HSP(F) to 1/4" Gauge (F)	2107-07-01.62
Changeover adaptor HSP(F) to 1620(M)	HSPF/1620M

Minimess Gas charging valves introduction

Easy-to-use gas charging valves with a leak proof guarantee are required for charging, discharging and pressure testing of hydraulic accumulators. HYDROTECHNIK fulfills these requirements with its gas charging valves.
The quality of a gas charging valve is paramount for the long term use in plants with high safety regulations. The valves are easy to use with a safe and reliable connection.

The essential advantages:

- Excellent leak proof integrity, leakage
  <2 x 10-5 mbar l s-1 within operating temperatures of -20°C to +135°C
- Uses the proven Minimess construction process valves open when connecting a microbore hose assembly
- For different accumulator designs, suitable adapters are available
- Military authorised

Gas charging valves can be applied where hydraulic accumulators are used, for example in:
Mobile hydraulics

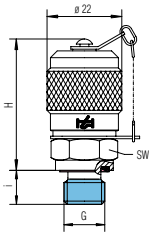
- Pressure energy source for power brake and steering boosters
- Spring element in the construction of vehicles and in stationary plants

Permanent hydraulic plant

- Maintaining the pressure in fastening devices, presses and pressing devices
- Additional sources of energy in stationary plant

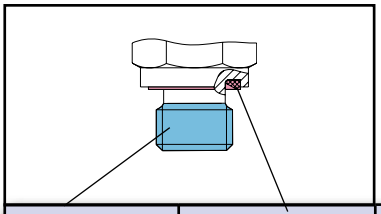
Minimess gas charging valves & adaptors

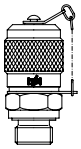
MINIMESS®-gas charging valve 1615
Maximum working pressure 63 MPa



Screw-cap thread:
M 16 x 1,5

Compatible with the following media
Inert gases, nitrogen and compressed air. Resistant against antifreeze, oil, anti corrosion oil, grease and fuel.




Execution: Metal cap

Thread G	Type of sealing A	Torque in Nm	p max Bar	H mm	i mm	SW mm	Operating temperature range	Coupling material	Part number with FKM sealing
M 12 x 1,5	Form F	30	63MPa	36,5	8,5	17	-20 °C bis +135 °C	1.4571	2402-01-13.50
M 14 x 1,5		40		36,5	10	19		1.4104	2402-01-14.00
ISO 228-G 1/4		40		36,5	10	19			2402-01-18.00

Recorded with inspection certificate 3.1 B in accordance to DIN EN 10204, certificate 2.2. in accordance to DIN EN 10204

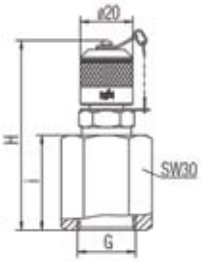
M 14 x 1,5	Form B	40	63 MPa	36,5	10	19	-33 °C bis +135°C	1.4104	2402-01-49.70

Material
Body: 1.4104 (C4)
Pressure spring: 1.4310
Screw cap: brass (blackened)

Sealing
Internal primary and secondary sealing as well as integral seat seal and anti vibration O-ring (to prevent loosening of the metal cap) made of Viton.

Attention: Before using oxygen, please ensure you rinse and clean the gas charging valve.

Adapter incorporating gas charging valve 1615 made of stainless steel



Thread of accumulator	Type of hydraulic accumulator	p max Bar	Material	H mm	i mm	SW mm	Part number with FKM sealing
7/8“-14 UNF	Bosch-bubble accumul.	63MPa	1.4104	73	36	30	2446-16-30.00
M 28 x 1,5	Bosch-diaphragm accumul.			63	26	36	2446-18-30.00

Gas charging valve adapter 1615
To be directly screwed on the original valve of the accumulator

Thread of accumulator	Type of hydraulic accumulator	p max Bar	Material	H mm	Part number with FKM sealing
VG 8 DIN 7756	Langen	63MPa	1.0718	32	5414-02-00.00
5/16“-32 UNEF	US			32	5414-02-10.00

Accumulator charging & testing kits

Accumulator charging and testing devices

- Charging of the hydraulic accumulator
- Testing and lowering the pressure within the hydraulic accumulator
- Pressure gauge Cl. 1,6 - Ø 63 mm

Pressure gauge display range	Measuring connection	Cylinder connection thread G	H mm	L mm	SW mm	Part number
0–400 bar	MINIMESS® 1615	W 24,32 x 1/14“	124	123	28	5114-01-00.10
0–250 bar	MINIMESS® 1620	W 24,32 x 1/14“	124	123	28	5114-21-03.00

Gas charging and testing device with pressure reducer valve

- Filling, adjusting and controlling gas pressure in hydraulic accumulators with nitrogen filling
- Pressure gauge Cl. 1,6 - Ø 63 mm
- Pressure gauge for primary pressure display 0 to 400 bar

Secondary adjustment	Pressure gauge display range, secondary	Measuring connection	Cylinder connection thread G	SW mm	Part number
1,0–235 bar	0–250 bar	MINIMESS® 1615	W 24,32 x 1/14“	28	5401-02-00.00
1,0–235 bar	0–250 bar	MINIMESS® 1615	W 21,8 x 1/14“	28	5401-02-02.00

Gas charging and flushing device with pressure reducer valve for low pressure

- Pre-adjustment of the flushing- and charging pressure
- Flushing and charging of nitrogen systems
- Pressure gauge Cl. 1,6 - Ø 63 mm
- Pressure gauge for primary pressure display 0 to 250 bar

Secondary adjustment	Pressure gauge display range, secondary	Measuring connection	Cylinder connection thread G	SW mm	Part number
0–1,3 bar	0–1,6 bar	MINIMESS® 1615	W 24,32 x 1/14“	28	5401-07-00.00
Complete measuring equipment with transport case and high pressure hose					5401-07-00.10

DN2 and DN4 High pressure Microbore hose Technical data

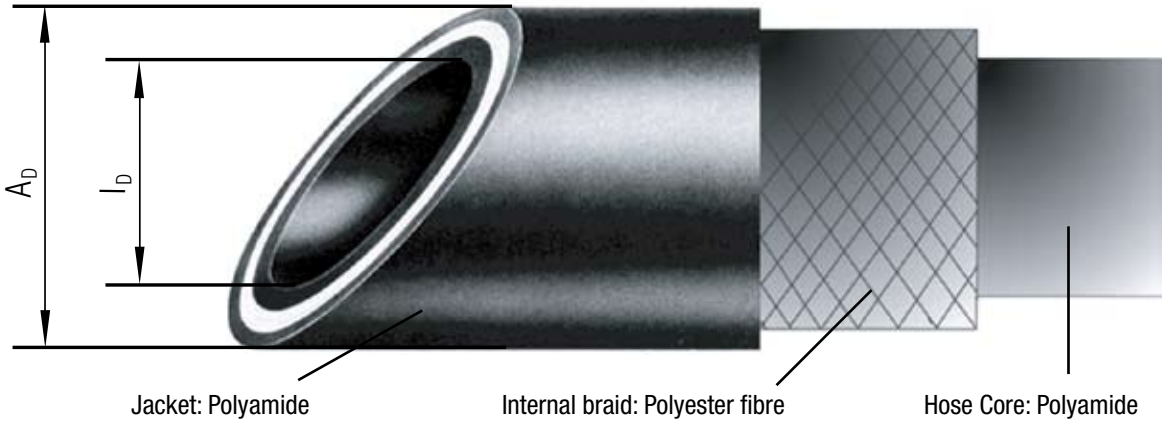
Microbore hose

The microbore hose assembly, most commonly used to connect to a Minimess® test point for pressure testing, has many other diverse applications.

The hose is available in 2mm and 4mm internal diameter up to 630 bar working pressure. The hose material is extremely flexible, light weight and can be specified for a large range of uses:

- Oils
- Water
- Bleeding
- Gases
- Sampling
- Aggressive media
- Grease
- Permanent installations
- Pressure testing up to 630 bar

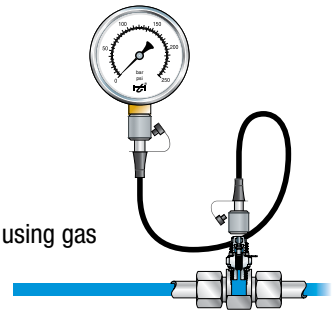
Technical data



Width Nominal	Design	Application	Max working Bar	pB Bar	Id mm	Ad mm	Min. Bend radius	Temperature range	Pressure utilisation factor
DN2	Standard 400	Perforated hose	400	1040	2	5	20 (below -20°C 30mm)	-20°C up to +100°C short time up to +120°C	0°C 122% 30°C 110% 50°C 100% 80°C 86% 100°C 77% 120°C 68% Example for calculation: MINIMESS®-hose DN 2/630 Bar at 30°C pressure utilisation factor: 630 x 1.10 = 693 Bar
DN2	Standard 630	Perforated hose	630	1950	2	5			
DN2	Low temperature	Perforated hose	630	1950	2	5		-54°C up to +100°C	
DN5	Standard 315	Perforated hose	315	810	4	8	40 (below -20°C 60)	-20°C up to +100°C short time up to +120°C	
DN4	Standard 450	Perforated hose	450	1500	4	8			

Reference of the specified data: 20°C – 3 K

pn	=	operating pressure
pB	=	bursting pressure
ID	=	internal diameter
AD	=	external diameter
rmin	=	Minimum bend radius of hose
Perforated hose	=	Jacket of hose is perforated for applications using gas



20mm bend radius!

Definition for the tightness of a MINIMESS - hose pipe

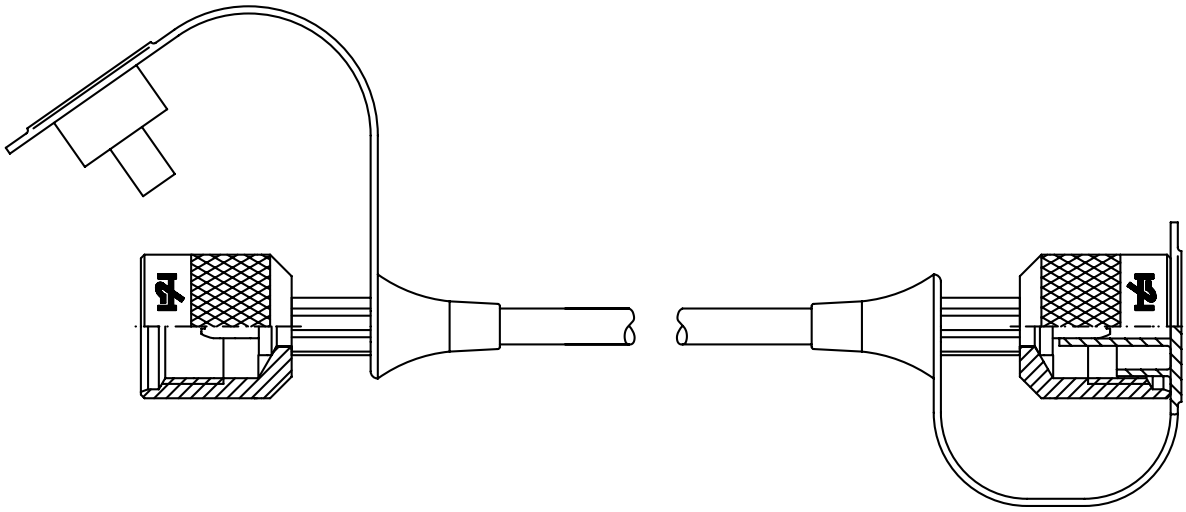
"Technically tight" describes systems, part systems and functional elements if the leakage rate amounts to < 0.00001 mbar l s-1.

Criteria for selection of hoses and fittings

1. Selection of the hose assembly for the maximum operating pressure (pN):
   When ordering a hose assembly, please pay attention to the operating pressures of both the hose material and the connection fitting. The lowest pressure determines the max. operating pressure of the complete hose assembly.
2. Selection of hose assembly for use with different media:
   Hose assemblies can be used with different media, as long as the end connections are suitable. To check the compatibility for different media, please contact us.

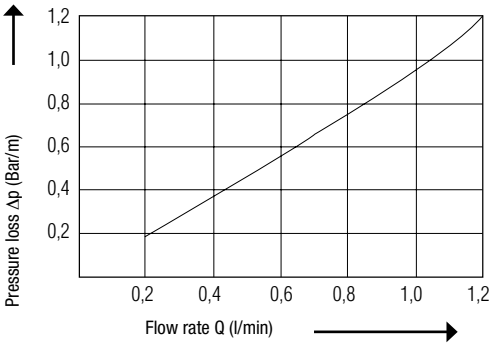
DN2 and DN4 High pressure Microbore hose Technical data

Pressure loss data of hose & hose assembly with 1620 female and fitting:

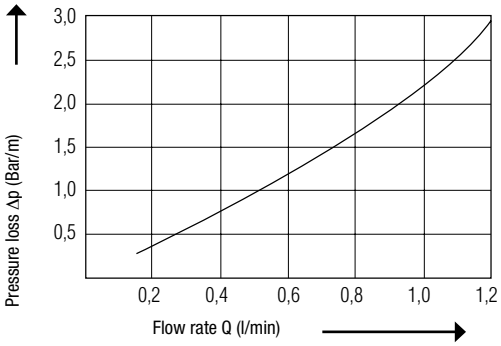


Safety note: The hose assemblies have to be protected from flames and sharp-edged, hot objects.

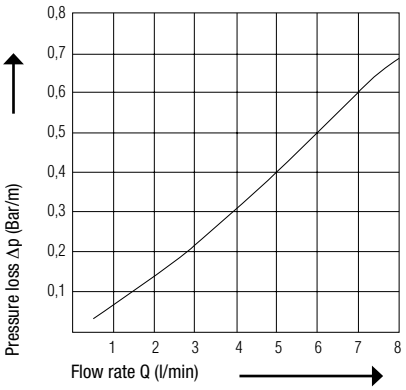
Pressure loss curve of DN 2 hose only
Pressure loss in Bar per metre of hose length without fittings, mineral oil: viscosity 30mm2 s-1



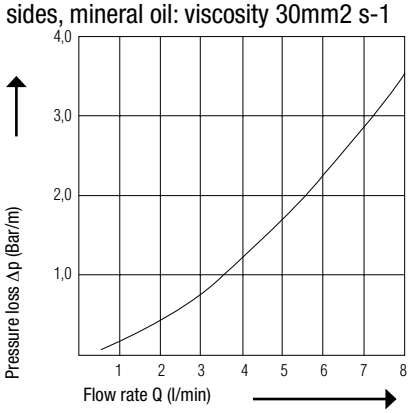
Pressure loss curve of DN 2 hose assemblies
Pressure loss in Bar through a hose assembly with a length of 1 m, with fittings and Test Points of series 1620 on both sides, mineral oil: viscosity 30mm2 s-1



Pressure loss curve of DN 4 hoses
Pressure loss in Bar per metre of hose length without fittings, mineral oil: viscosity 30mm2 s-1

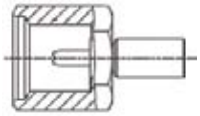
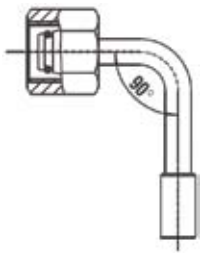


Pressure loss curve of DN 4 hose pipes
Pressure loss in Bar through a hose assembly with a length of 1m, with fittings and test points of series 1604 on both sides, mineral oil: viscosity 30mm2 s-1



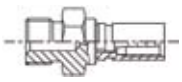
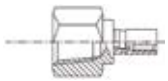
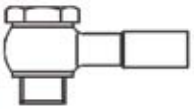
We guarantee a very high quality level of our MINIMESS® systems, as all components are manufactured very precisely and to tight tolerances. All parts in our MINIMESS® systems are easy and safe to use. We reserve the right to carry out technical modifications!

Microbore hose end codes

Picture	Description	Hose code	DN2	DN4
	1215 swivel female with knurled nut	AA	✓	✓
	1615 swivel female with knurled nut	AB	✓	✓
	1620 swivel female with knurled nut	AC	✓	✓
	1604 swivel female with knurled nut	AD	x	✓
	1215 swivel female with in built check valve	AP	✓	x
	1615 swivel female with in built check valve	AQ	✓	x
	1620 swivel female with in built check valve	AR	✓	x
	1604 swivel female with in built check valve	AY	x	✓
	1215 swivel female 90° compact hex nut	AJ	✓	x
	1615 swivel female 90° compact hex nut	AK	✓	x
	1620 swivel female 90° compact hex nut	AL	✓	x
	1215 swivel female test point with hex nut	AM	✓	x
	1615 swivel female test point with hex nut	AN	✓	x
	1620 swivel female test point with hex nut	AO	✓	x
	Steck plug-in test point	AI	✓	x
	ISO228-G1/4" BSP swivel female gauge	FA	✓	✓
	ISO228-G1/2" BSP swivel female gauge	FB	✓	x
	ISO228-G1/4" BSP swivel female gauge 90° swept	FC	✓	x
	ISO228-G1/2" BSP swivel female gauge 90° swept	FD	✓	x
	M12 x 1.5 (6L) Swivel Female 24° Sealing cone	CQ	✓	✓
	M14 x 1.5 (8L) Swivel Female 24° Sealing cone	CR	✓	✓
	M16 x 1.5 (10L) Swivel Female 24° Sealing cone	CS	✓	✓
	M18 x 1.5 (12L) Swivel Female 24° Sealing cone	CT	✓	✓
	M14 x 1.5 (6S) Swivel Female 24° Sealing cone	CU	✓	✓
	M16 x 1.5 (8S) Swivel Female 24° Sealing cone	CV	✓	✓
	M18 x 1.5 (10S) Swivel Female 24° Sealing cone	CW	✓	✓
	M20 x 1.5 (12S) Swivel Female 24° Sealing cone	CX	✓	✓
	M12 x 1.5 (6L) Swivel Female 24° Sealing cone 90° Swept	DA	✓	x
	M14 x 1.5 (8L) Swivel Female 24° Sealing cone 90° Swept	DB	✓	x
	M16 x 1.5 (10L) Swivel Female 24° Sealing cone 90° Swept	DC	✓	x
	M18 x 1.5 (12L) Swivel Female 24° Sealing cone 90° Swept	DD	✓	x
	M14 x 1.5 (6S) Swivel Female 24° Sealing cone 90° Swept	DE	✓	x
	M16 x 1.5 (8S) Swivel Female 24° Sealing cone 90° Swept	DF	✓	x
	M18 x 1.5 (10S) Swivel Female 24° Sealing cone 90° Swept	DG	✓	x
	M20 x 1.5 (12S) Swivel Female 24° Sealing cone 90° Swept	DH	✓	x

Continued on next page

Microbore hose end codes

Picture	Description	Hose code	DN2	DN4
	4mm Standpipe	BA	✓	x
	6mm Standpipe	BB	✓	✓
	8mm Standpipe	BC	✓	✓
	1/4" Standpipe	BD	✓	x
	6mm Standpipe 90° Swept	BG	✓	x
	1/8" BSP swivel female 60° cone seal	FF	✓	x
	1/4" BSP swivel female 60° cone seal	DI	✓	✓
	1/8" BSP fixed male 60° cone seal	FM	✓	x
	1/4" BSP fixed male 60° cone seal	DM	✓	x
	1/8" NPT fixed female	PF	✓	x
	1/4" NPT fixed female	PI	✓	x
	1/8" NPT fixed male	PA	✓	x
	1/4" NPT fixed male	PB	✓	x
	7/16" JIC Swivel Female 37° Cone seal	MJ	✓	x
	9/16" UNF swivel female ORFS	BM	✓	x
	11/16" UNF swivel female ORFS	HC	✓	x
	M10 x 1 Banjo to suit M10 x 1 bolt	IB	✓	x
	M10 x 1 Banjo c/w 10mm bolt	IA	✓	x

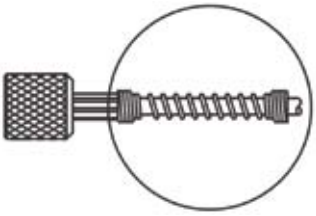
Loose hose & accessory codes

Hose material DN 2 and DN 4

Hose material for self assembly		Part number
Perforated hose, DN 2	40,0 MPa	2020-01-00.31
Perforated hose, DN 2	63,0 MPa	2020-01-00.30
Low temperature, Perforated hose, DN 2	63,0 MPa	2020-01-00.18

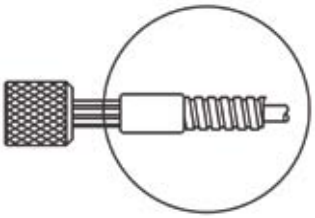
Perforated hose, DN 4	31,5 MPa	2030-01-00.22
Perforated hose, DN 4	45,0 MPa	2030-01-00.24

Anti-buckling spiral



Anti-buckling spiral for self assembly	Part number
Anti-buckling spiral for DN 2	2123-01-00.01
Anti-buckling spiral for DN 4	2133-01-00.01

Aluminium protection braid



Aluminium protection hose for self assembly	Part number
Aluminium protection hose DN 2 In addition to this, 2 pieces end screw sockets are necessary	2121-01-00.01
End screw sockets DN 2	2121-01-00.02

Aluminium protection hose for self assembly	Part number
Aluminium protection hose DN 4 In addition to this, 2 pieces end screw sockets are necessary	2131-01-00.01
End screw sockets DN 4	2131-01-00.02

Other accessories

- Coloured heat shrink jackets
- Hose identification tags
- Customer branded labels
- Hose pressure testing and certification

Contact us for more information

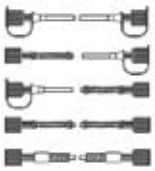
DN2 & DN4 hose assembly ordering chart

Options	Part number S X X X - X X - X X - X X X X
Material of the fittings	
Zinc Nickle Plated Carbon Steel	1
Stainless Steel	3

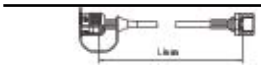
DN2 hose options		
Perforated standard hose	40,0 MPa (400 bar)	0
Perforated standard hose	63,0 MPa (630 bar)	1
Perforated low temperature hose	63,0 MPa (630 bar)	2

DN4 hose options		
Perforated standard hose	31,5 MPa (315 bar)	5
Perforated standard hose	45,0 MPa (450 bar)	6

Accessories	
Standard	0
Anti buckling spring, left side (min. hose length 40 cm)	1
Anti-buckling spring, right side (min. hose length 40 cm)	2
Anti-buckling spring both sides (min. hose length 40 cm)	3
Aluminium protection hose (min. hose length 40 cm)	4



Hose ends & hose length
Hose end code 1 (see page 18-19)
Hose end code 2 (see page 18-19)
Length L in cm (e.g. 30 cm = 0030 or 500 cm = 0500) Input as a 4-digit group of figures



Please note: Aluminium overbraid can not be used in conjunction with anti buckle springs

Ordering example: S110-AC-FA-00.63
DN2 (630bar) hose assembly with 1620 female hose end to G1⁄4" BSP female gauge hose end, 630mm (63cm) long.

Stainless steel wire-braided PTFE bore Microbore hose
Hydrotechnik UK can now offer microbore hose with a stainless steel wire braid & PTFE inner tube. With a large temperature range and rugged construction, this hose will stand up to the harshest of operating conditions. Suitable for most fluids.

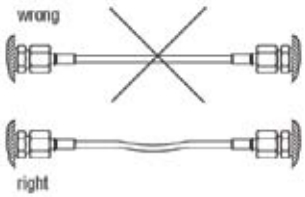
Specifications

Internal diameter	2mm
External diameter	5mm
Max working pressure	450 bar
Min Bend Radius	13 mm
Temperature range (pressure dependant over 130°C)	-70°C to 260°C

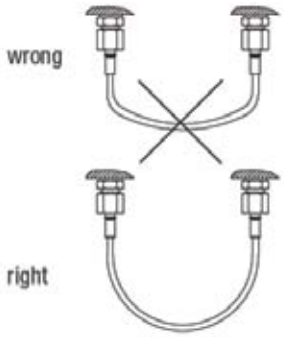
Please use hose code 9 in table above for this hose option e.g S190-AC-FA-00.63

Installation of microbore hose assemblies

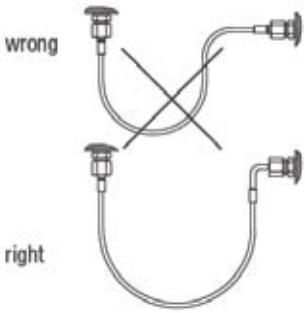
Correct operation & long life is dependent upon the correct installation. Please see below:-



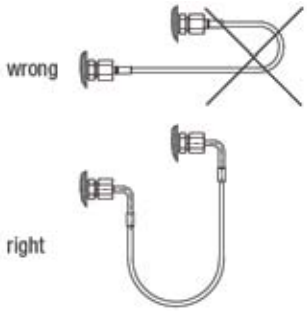
Under load, the length of a hose pipe can change. A shortening causes an additional tensile stress of the hose and the connections. Therefore, the hose pipe needs “slack” in an unpressurised state. Please tighten the union nuts only so far using recommended tightening torques.
Further tightening does not improve the operation and can damage the connections.



With curved assemblies, attention has to be paid to the bending radius. Sharp bends should be avoided wherever possible. When calculating the length of a hose assembly, please to pay attention to the fact that the connection fittings are not flexible. The correct calculation of the free hose length between the fittings is therefore essential.



90° hose fittings are also available to aid in the fitting of hose assemblies to maximize life and operation of the assembly.



90° hose fittings can also aid in the fitting of a tidy hose assembly in the tightest of porting requirements.

Notes for operation and installation

In order to guarantee the operability of hoses and to not reduce assembly life by introducing additional strains, the following points have to be taken into consideration:

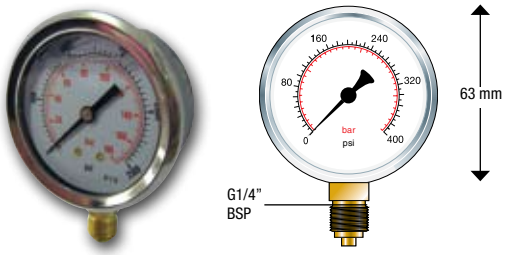
- Hose assemblies may not be strained during operation by external influences like tension, torsion and upset.
- The smallest mentioned bending radius of the hose must not be exceeded at any time.
- Hose assemblies have to be protected against external damages caused by thermal, chemical or mechanical influences.
- Painting or marking of hose assemblies should be avoided.

Notes for storage of hose and hose assemblies

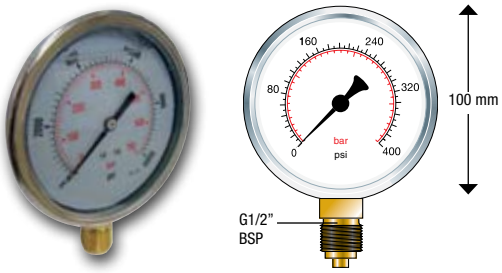
- Store in cool, dry places and avoid direct UV-irradiation.
- Sources of radiant heat should be avoided.
- Ozone building light fittings and electronic instruments with sparking should be kept away from hoses and hose material (e.g. mercury vapour discharge lamps)
- Optimum storage conditions are temperatures between +15°C and +25°C, a relative air humidity of 65%, as well as shielding against UV-radiation by special UV-impervious foils.
- The storage time should not exceed four years for hose and two years for hose assemblies.

Analogue pressure gauges

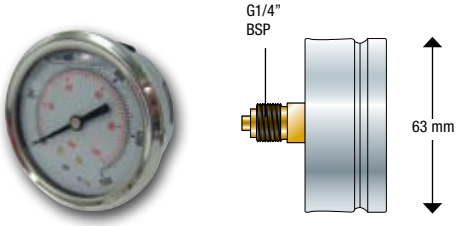
Hydrotechnik supply and stock a large range of analogue pressure gauges 63 & 100mm. Manufactured in accordance with BS-EN837-1 specifications, all gauges are to ±1.6% accuracy. Stocked gauges are glycerine-filled as standard with stainless steel casing and brass connection/internals. Scaling is dual bar (in red – inner scale) and psi (in black – outer scale).



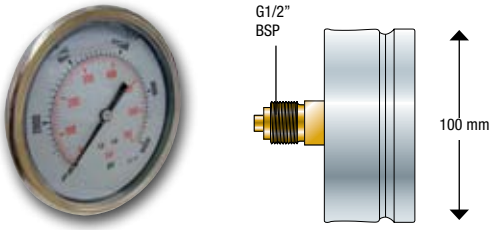
9801 series - 63mm bottom entry



9803 series - 100mm bottom entry



9807 series - 63mm rear entry



9808 series - 100mm rear entry

Series see illustration above
9801
9803
9807
9808

Code	PSI	Bar
60C	-15 to 60	-1 to 4
15	0 to 15	0 to 1
30	0 to 30	0 to 2
60	0 to 60	0 to 4
100	0 to 100	0 to 7
160	0 to 160	0 to 11
200	0 to 200	0 to 14
300	0 to 300	0 to 20
400	0 to 400	0 to 28
500	0 to 500	0 to 35
600	0 to 600	0 to 40
1000	0 to 1000	0 to 70
1500	0 to 1500	0 to 100
2000	0 to 2000	0 to 140
2500	0 to 2500	0 to 170
3000	0 to 3000	0 to 200
4000	0 to 4000	0 to 280
5000	0 to 5000	0 to 350
6000	0 to 6000	0 to 400
10000	0 to 10000	0 to 700

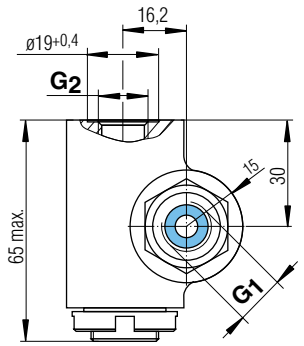
Accessories if applicable	
Protective rubber gauge cuff for 9801 series only	GC
Front panel mounting three bolt fixing flange for 9807 and 9808 series only	FF
Rear fixing clamp for 9807 and 9808 series only	RC

Hydrotechnik also supply a full range of pressure gauges from 40mm to 150mm and all stainless steel gauges. Please contact us for your requirements.

Analogue pressure gauge accessories

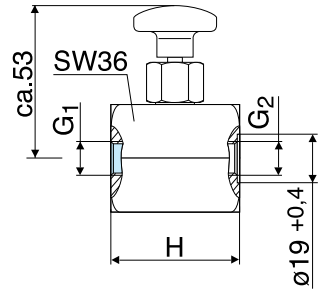
Pressure limiting valves

Used for protection of pressure gauges against overload



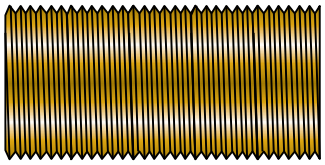
Adjustable pressure range Bar	Gauge connection G1 according to DIN 16288	Connection G2 according to DIN 3852	Part number Form X
5 - 9	ISO 228-G 1/4	ISO 228-G 1/4	5110-01-20.00
1 - 25	ISO 228-G 1/4	ISO 228-G 1/4	5110-02-20.00
2.5 - 63	ISO 228-G 1/4	ISO 228-G 1/4	5110-03-20.00
63 - 100	ISO 228-G 1/4	ISO 228-G 1/4	5110-04-20.00
100 - 250	ISO 228-G 1/4	ISO 228-G 1/4	5110-05-20.00
250 - 600	ISO 228-G 1/4	ISO 228-G 1/4	5110-07-20.00
5 - 9	ISO 228-G 1/2	ISO 228-G 1/4	5110-01-20.00
1 - 25	ISO 228-G 1/2	ISO 228-G 1/4	5110-02-20.00
25 -63	ISO 228-G 1/2	ISO 228-G 1/4	5110-03-20.00
63 - 100	ISO 228-G 1/2	ISO 228-G 1/4	5110-04-20.00
100 - 250	ISO 228-G 1/2	ISO 228-G 1/4	5110-05-20.00
250 - 600	ISO 228-G 1/2	ISO 228-G 1/4	5110-07-20.00

Pressure restrictor valve



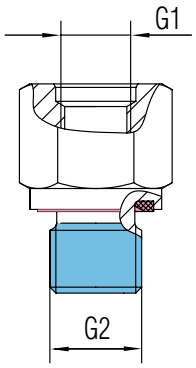
Thread G1	Thread G2	H mm	p max mm	Description	Part number
ISO 228-G 1/4	ISO 228-G 1/4	53	630	Adjustable under pressure up to 150 Bar in-line connection	5104-03-00.00
ISO 228-G 1/2	ISO 228-G 1/4	58	630		5104-02-00.00

Damping cartridge (snubber)



Borehole: nozzle Ø	Material	Application	Part number
0.5	2.0401	Choking element for dampening of fluidity vibrations	2100-24-01.00

Gauge thread reducing adaptor

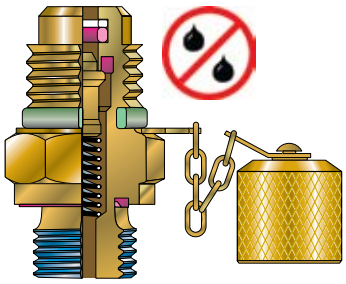


Thread G1	Thread G2	Part number Brass
G 1/2"	G 3/8"	16GF-12GM
G 1/2"	G 1/4"	16GF-08GM
G 3/8"	G 1/4"	12GF-08GM

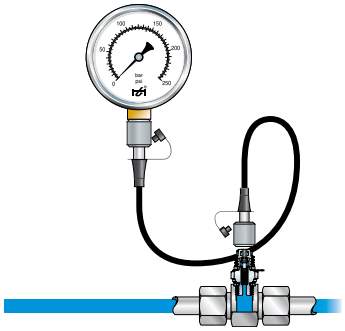
Other threaded adaptors available on request

Low cost pressure test kit

Model: 3101-16-XX.LC



life-time leak free guarantee



Features:
- Test under pressure using Hydrotechnik leak free Minimess connections up to 630 bar
- Everything you need to get two pressure readings
- Ultra low cost - ideal for OEM's
- Printed logo & contact details on kit box*

Kit contents
- 2 x 63mm glycerine filled pressure gauges user selectable up to 700 bar.
- 2 x Minimess™ 1620 test points - 1/4" BSP & M10x1 threaded. 1 x G1/4" BSP to 1620 gauge adaptor.
- 1 x 630 bar rated Minimess™ pressure test hose - 1.5 meters long.
- Additional 3/8" & 1/2" BSP male threaded adaptors & seals.

Order code:

3101-16- X X .LC

Replace X in above code with pressure gauges required from the following options:

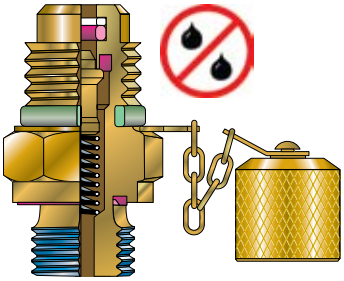
0 = 0 to 7 bar	5 = 0 to 100 bar
1 = 0 to 14 bar	6 = 0 to 170 bar
2 = 0 to 28 bar	7 = 0 to 280 bar
3 = 0 to 40 bar	8 = 0 to 400 bar
4 = 0 to 70 bar	9 = 0 to 700 bar

All pressure gauges have dual bar / psi scale. ±1.6% acc.
Special gauge ranges available on request

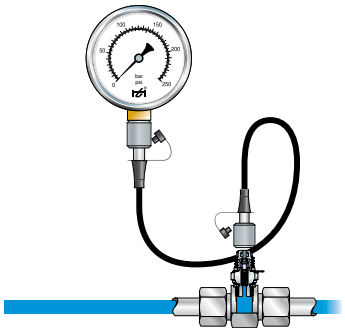
* Minimum orders of 5 kits.

BSP pressure test kit

Model: 3101-16-XX.50



life-time leak free guarantee



Features:
- Test under pressure using Hydrotechnik leak free minimess connections up to 630 bar
- Additional In-line test point tees offer excellent system access versatility
- Printed logo & contact details on kit box*

Kit contents
- 2 x 63mm glycerine filled pressure gauges user selectable up to 700 bar.
- 3 x Minimess™ Male/Swivel Female 1620 inline test point adaptors. 1/4”, 3/8” & 1/2” BSP.
- 1 x Minimess™ 1620 test point - 1/4” BSP. 1 x G1/4” BSP to 1620 gauge adaptor.
- 1 x 630 bar rated Minimess™ pressure test hose - 1.5 meters long.
- Additional 3/8” & 1/2” BSP male threaded adaptors & seals.

Order code:

3101-16- X X .50

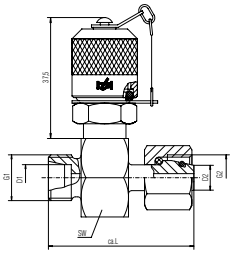
Replace X in above code with pressure gauges required from the following options:

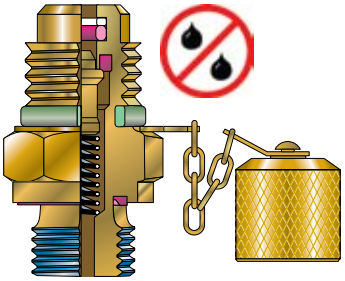
0 = 0 to 7 bar	5 = 0 to 100 bar
1 = 0 to 14 bar	6 = 0 to 170 bar
2 = 0 to 28 bar	7 = 0 to 280 bar
3 = 0 to 40 bar	8 = 0 to 400 bar
4 = 0 to 70 bar	9 = 0 to 700 bar

All pressure gauges have dual bar / psi scale. ±1.6% acc.
Special gauge ranges available on request

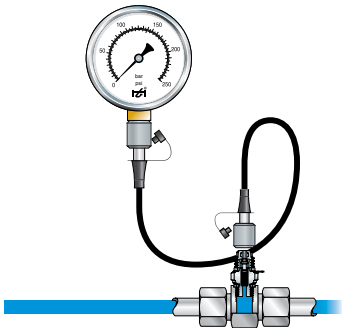
* Minimum orders of 5 kits.

Metric pressure test kit





life-time leak free guarantee



Model: 3101-16-XX.MET

Features:
- Test under pressure using Hydrotechnik leak free minimess connections up to 630 bar
- Connect & disconnect under full system pressure. Lifetime leak free guarantee
- Additional In-line test point tees offer excellent system access versatility
- Printed logo & contact details on kit box*

Kit contents
- 2 x 63mm glycerine filled pressure gauges user selectable up to 700 bar.
- 3 x Minimess™ Male/Swivel Female 1620 inline test point adaptors. 6S, 8S & 12S metric DKO.
- 2 x Minimess™ 1620 test points - M10 x1 & M12x1.5.
- 1 x G1/4" BSP to 1620 gauge adaptor.
- 1 x 630 bar rated Minimess™ pressure test hose - 1.5 meters long.

Order code:

3101-16- X X .MET

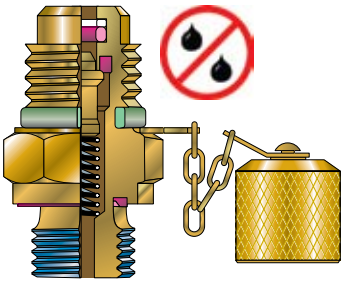
Replace X in above code with pressure gauges required from the following options:

0 = 0 to 7 bar	5 = 0 to 100 bar
1 = 0 to 14 bar	6 = 0 to 170 bar
2 = 0 to 28 bar	7 = 0 to 280 bar
3 = 0 to 40 bar	8 = 0 to 400 bar
4 = 0 to 70 bar	9 = 0 to 700 bar

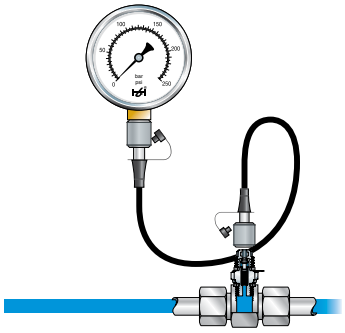
All pressure gauges have dual bar / psi scale. ±1.6% acc.
Special gauge ranges available on request

JIC pressure test kit

Model: 3101-16-XX.JIC



life-time leak free guarantee



Features:
- Test under pressure using Hydrotechnik leak free minimess connections up to 630 bar
- Connect & disconnect under full system pressure. Lifetime leak free guarantee
- Additional In-line test point tees offer excellent system access versatility
- Printed logo & contact details on kit box*

Kit contents
- 2 x 63mm glycerine filled pressure gauges user selectable up to 700 bar.
- 3 x Minimess™ Male/Swivel Female 1620 inline test point adaptors. 7/16", 9/16" & 7/8" JIC.
- 2 x Minimess™ 1620 test points - 7/16"& 9/16" UNF.
- 1 x 1/4" NPT to 1620 gauge adaptor.
- 1 x 630 bar rated Minimess™ pressure test hose - 1.5 meters long.

Order code:

3101-16- X X .JIC

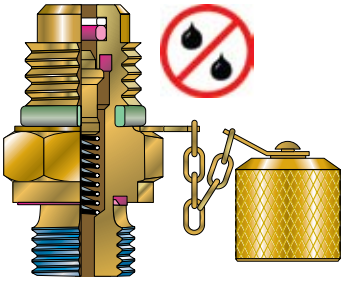
Replace X in above code with pressure gauges required from the following options:

0 = 0 to 7 bar	5 = 0 to 100 bar
1 = 0 to 14 bar	6 = 0 to 170 bar
2 = 0 to 28 bar	7 = 0 to 280 bar
3 = 0 to 40 bar	8 = 0 to 400 bar
4 = 0 to 70 bar	9 = 0 to 700 bar

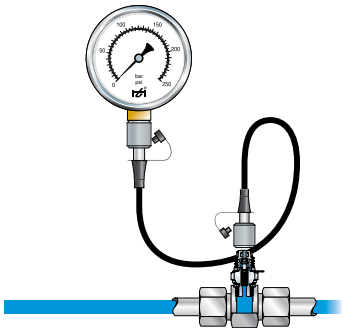
All pressure gauges have dual bar / psi scale. ±1.6% acc.
Special gauge ranges available on request

ORFS pressure test kit

Model: 3101-16-XX.ORFS



life-time leak free guarantee



Features:
- Test under pressure using Hydrotechnik leak free minimess connections up to 630 bar
- Connect & disconnect under full system pressure. Lifetime leak free guarantee
- In-line test point tees offer excellent system access versatility
- Printed logo & contact details on kit box*

Kit contents
- 2 x 63mm glycerine filled pressure gauges user selectable up to 700 bar.
- 3 x Minimess™ Male/Swivel Female 1620 inline test point adaptors. 9/16”, 11/16” & 13/16” ORFS.
- 2 x Minimess™ 1620 test points - 7/16”& 9/16” UNF.
- 1 x 1/4” NPT to 1620 gauge adaptor.
- 1 x 630 bar rated Minimess™ pressure test hose - 1.5 meters long.

Order code:

3101-16- X X .ORFS

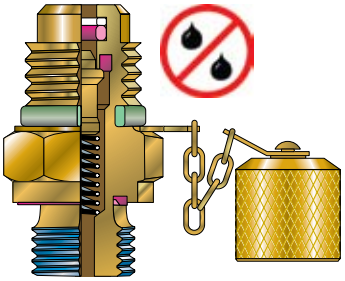
Replace X in above code with pressure gauges required from the following options:

0 = 0 to 7 bar	5 = 0 to 100 bar
1 = 0 to 14 bar	6 = 0 to 170 bar
2 = 0 to 28 bar	7 = 0 to 280 bar
3 = 0 to 40 bar	8 = 0 to 400 bar
4 = 0 to 70 bar	9 = 0 to 700 bar

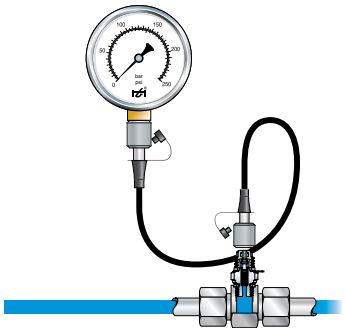
All pressure gauges have dual bar / psi scale. ±1.6% acc.
Special gauge ranges available on request

Universal pressure test kit

- ✓ 1620
- ✓ 1615
- ✓ 1215
- ✓ Steck (Push in)
- ✓ HSP (5/8" BSF)



life-time leak free guarantee



Model: 3101-16-XX.UTK

Features:
- All major test point variants covered with one kit. The ultimate service tool
- Connect & disconnect under full system pressure. Lifetime leak free guarantee
- In-line test point tees offer excellent system access versatility
- Amazing value for range of testing capabilities included
- Printed logo & contact details on kit box*

Kit contents
- 2 x 63mm glycerine filled pressure gauges user selectable up to 700 bar.
- 3 x Minimess™ Male/Swivel Female 1620 inline test point adaptors. 1/4", 3/8" & 1/2" BSP.
- 3 x Minimess™ 1620 changeover adaptors from 1215, 1615 & HSP(5/8"BSF)
- 1 x Minimess™ 1620 test point - 1/4" BSP. 1 x G1/4" BSP to 1620 gauge adaptor.
- 2 x 630 bar rated Minimess™ pressure test hoses (1620 & Steck) - 1.5 meters long.
- Additional 3/8" & 1/2" BSP male threaded adaptors & seals.

Order code:

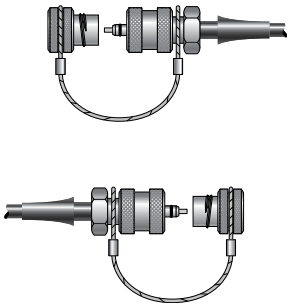
3101-16- X X .UTK

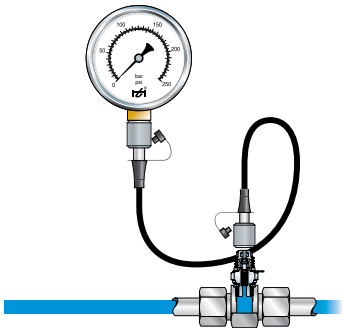
Replace X in above code with pressure gauges required from the following options:

0 = 0 to 7 bar	5 = 0 to 100 bar
1 = 0 to 14 bar	6 = 0 to 170 bar
2 = 0 to 28 bar	7 = 0 to 280 bar
3 = 0 to 40 bar	8 = 0 to 400 bar
4 = 0 to 70 bar	9 = 0 to 700 bar

All pressure gauges have dual bar / psi scale. ±1.6% acc.
Special gauge ranges available on request

JCB style pressure test kit





Model: 3101-16-XX.JCB

Features:
- Test under pressure using JCB style test point plugs (5/8” BSF test thread)
- Connect & disconnect under full system pressure
- In-line test point tees offer excellent system access versatility
- A must have kit for any service engineer working on JCB machinery
- Printed logo & contact details on kit box*

Kit contents
- 2 x 63mm glycerine filled pressure gauges user selectable up to 700 bar.
- 3 x Male/Swivel Female inline test point plug adaptors. 1/4”, 3/8” & 1/2” BSP.
- 1 x JCB style test point plug - 1/4” BSP. 1 x G1/4” BSP to JCB style test point plug female.
- 1 x 400 bar rated pressure test hose - 1.5 meters long.
- Additional 3/8” & 1/2” BSP male threaded adaptors & seals.

Order code:

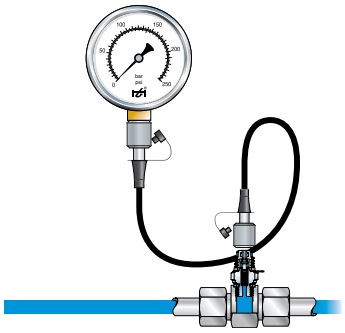
3101-16- X X .JCB

Replace X in above code with pressure gauges required from the following options:

0 = 0 to 7 bar	5 = 0 to 100 bar
1 = 0 to 14 bar	6 = 0 to 170 bar
2 = 0 to 28 bar	7 = 0 to 280 bar
3 = 0 to 40 bar	8 = 0 to 400 bar
4 = 0 to 70 bar	9 = 0 to 700 bar

All pressure gauges have dual bar / psi scale. ±1.6% acc.
Special gauge ranges available on request

Caterpillar style pressure test kit



Model: 3101-20-XX.CAT

Features:
- Compatible with most Caterpillar machines
- Connect & disconnect under full system pressure
- Large selection of In-line test point tees offer excellent system access versatility
- A must have kit for any service engineer working on CAT machinery
- Printed logo & contact details on kit box*

Kit contents
- 2 x 63mm glycerine filled pressure gauges user selectable up to 700 bar.
- 7 x Male/Swivel Female QRC (flat faced quick release) inline adaptors. 7/16", 1/2", 9/16", 3/4", 7/8", 1.1/16" & 1.5/16" JIC.
- 2 x Minimess™ to QRC socket test adaptors.
- 1 x 400 bar rated Minimess™ pressure test hose - 1.5 meters long.

Order code:

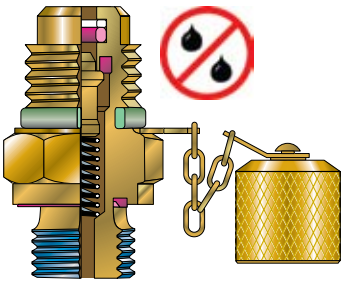
3101-20-[X][X].CAT

Replace X in above code with pressure gauges required from the following options:

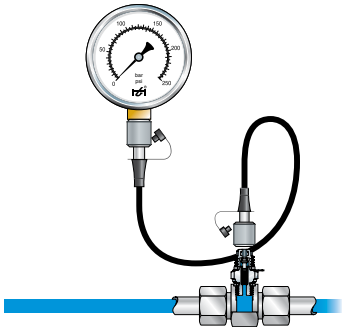
0 = 0 to 7 bar	5 = 0 to 100 bar
1 = 0 to 14 bar	6 = 0 to 170 bar
2 = 0 to 28 bar	7 = 0 to 280 bar
3 = 0 to 40 bar	8 = 0 to 400 bar
4 = 0 to 70 bar	9 = 0 to 700 bar

All pressure gauges have dual bar / psi scale. ±1.6% acc.
Special gauge ranges available on request

Fabricated metal 4 gauge pressure test box



life-time leak free guarantee



Model: 3101-MB-4
Box dimensions: (385 x 250 x 85mm)

Features:

- New addition to our popular pressure test kit series, 4 or 6 fixed gauge test kits allow for pressure testing of multiple lines or a full range of pressure testing capabilities in one kit.
- Robust multi-gauge measuring kit for rapid pressure testing of hydraulic system pressures
- Test under pressure using Hydrotechnik leak free minimess connections up to 630 bar
- Large sturdy metal carry case with hose and adaptor compartments in base, 4 fixed gauges in lid
- Ideal for the mobile construction and agricultural service engineers
- Laser etched customer logos available*

Kit contents

- 4 x 63mm glycerine filled pressure gauges user selectable up to 700 bar - 1620 male connectors.
- 6 x Minimess® 1620 test points - 1/8" & 1/4" BSP, 1/8" & 1/4" NPT, M12x1.5 & M14x1.5 threaded.
- 4 x 630 bar rated Minimess® pressure test hoses - 2 meters long.
- Additional 3/8" & 1/2" BSP xmale threaded adaptors.

Order code:

3101-MB-4- X X X X

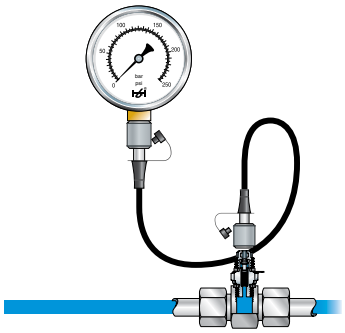
Replace X in above code with pressure gauges required from the following options:

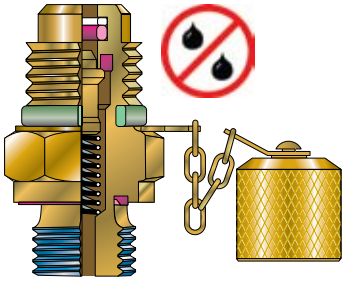
0 = 0 to 7 bar	5 = 0 to 100 bar
1 = 0 to 14 bar	6 = 0 to 170 bar
2 = 0 to 28 bar	7 = 0 to 280 bar
3 = 0 to 40 bar	8 = 0 to 400 bar
4 = 0 to 70 bar	9 = 0 to 700 bar

All pressure gauges have dual bar / psi scale. ±1.6% acc.
Special gauge ranges available on request

Fabricated metal 6 gauge pressure test box

Model: 3101-MB-6
Box dimensions: (570 x 250 x 85mm)





life-time leak free guarantee

Features:

- New addition to our popular pressure test kit series, 4 or 6 fixed gauge test kits allow for pressure testing of multiple lines or a full range of pressure testing capabilities in one kit.
- Robust multi-gauge measuring kit for rapid pressure testing of hydraulic system pressures.
- Test under pressure using Hydrotechnik leak free minimess connections up to 630 bar.
- Large sturdy metal carry case with hose and adaptor compartments in base, 6 fixed gauges in lid.
- Ideal for the mobile construction and agricultural service engineers.
- Laser etched customer logos available*

Kit contents

- 6 x 63mm glycerine filled pressure gauges user selectable up to 700 bar - 1620 male connectors.
- 6 x Minimess® 1620 test points - 1/8” & 1/4” BSP, 1/8” & 1/4” NPT, M12x1.5 & M14x1.5 threaded.
- 6 x 630 bar rated Minimess® pressure test hoses - 2 meters long.
- Additional 3/8” & 1/2” BSP and 7/16” & 9/16” JIC male threaded adaptors.

Order code:

3101-MB-6- X X X X X X

Replace X in above code with pressure gauges required from the following options:

0 = 0 to 7 bar	5 = 0 to 100 bar
1 = 0 to 14 bar	6 = 0 to 170 bar
2 = 0 to 28 bar	7 = 0 to 280 bar
3 = 0 to 40 bar	8 = 0 to 400 bar
4 = 0 to 70 bar	9 = 0 to 700 bar

All pressure gauges have dual bar / psi scale. ±1.6% acc.
Special gauge ranges available on request

Hydraulic and Pneumatic Calibration Hand Pumps

High Quality Hand Pump Kits for Hydraulic or Pneumatic testing & calibration.

The M-10 pump is for Hydraulic use and can test up to 700 bar utilising standard adaptors or Minimess® test points.
The MVP-600 is for Pneumatic use and can test Vacuum 28"Hg up to pressure 40 bar.

M-10 Hydraulic Calibration Hand Pump

Features
- Patented protective cage around vent knob
- Priming feature for fast air purge
- Patented triple filtration (prevents pump failure caused by dirt)
- Shatter proof reservoir
- Oversized check valves for smooth controlled operation

Specifications
- 0-10,000 psi (700 Bar)
- Compatible with most hydraulic fluids, oils nd water
- Connections (2 ports) 1/4 inch and 3/8 inch NPT/ BSP
- Weight 3lbs

Part Number
M-10KT

Kit includes: Pump, black padded canvas case embroidered in orange thread, 3ft high pressure hose, fittings, adaptors, (3) spare filters, fluid bottle and a test point.

MVP-600 Pneumatic Calibration Hand Pump

Features
- Contoured cushion handles.
- Oversized vernier for smooth controlled operation.
- Mash proof vent valve (No Needle Valve).
- Does both pressure and vacuum.
- Dual 0-Rings on all pistons to ensure zero leakage.

Specifications
- Vacuum 28"Hg to pressure 600psi (combination pump)
- Compatible with all gauges and calibrators
- Connections (2 ports) 1/4 inch and 1/8 inch NPT/BSP
- Weight 2lbs

Part Number
MVP-600KT

Kit includes: Pump, black padded canvas case embroidered in orange thread, 2ft non-stretch hose, fittings, additional rubber bonded washers and (2) adaptors.

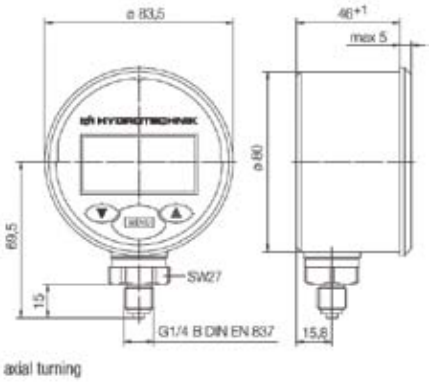
Hand Pump Kits can also be supplied with our Digital Gauges and supplied with Calibration Certificates on request. Available in 60, 250 or 600 bar options. Calibrated analogue gauges are also available up to 700 bar.

Digital pressure gauges & kits

Digital pressure gauges

The ideal low cost solution to digital pressure testing. With display of pressure and pressure peaks, digital pressure gauges offer excellent accuracy and peak capture which a standard pressure gauge simply can not provide. The unit comes with a rotatable face for better reading. Simple operation via a 3 button panel. Min/Maximum values displayed with each test.

- Great Accuracy
- Easy to read
- Rotate display
- Easy to use
- Peak min/max storage
- Low cost



Technical data

Display:	4-digit, 7-segment LCD display, 11 mm height, additional bar graph with 10 segments scale
Accuracy:	± 0.5% of F.S. Convertion rate: 5/sec
Measuring range:	0 to 60 bar, 0 to 250 bar or 0 to 600 bar
Units:	MPa, PSI and bar
Overload limit:	Proof pressure, 2.0x, 1000 bar max
Pressure connection:	ISO 228-G 1/4
Wetted parts:	Stainless steel 1.4571
Power supply:	9 V monoblock battery, 5000 h
Protection type:	IP 65 accord. to EN 60529/IEC 529
Case:	Stainless steel
Weight:	0.4 kg

Options & Ordering Information

Pressure range Bar	Part number Brass
0 - 60	9801-99-00.60
0 - 250	9801-99-02.50
0 - 600	9801-99-06.00

MINIMESS®- digital pressure test kits

One or two digital pressure gauges with Minimess test points, adaptors & hose in carry case

Single gauge kit Part codes

Pressure range Bar	Part number
0 - 60	3101-81-04.50
0 - 250	3101-81-07.50
0 - 600	3101-81-09.50

Double gauge kit Part codes

		Part number
Pressure ranges Bar	Identification	3101 - 81 - X X.50
0–60	4	Gauge 1 / Gauge 2
0–250	6	
0–600	9	

PS120 Digital Pressure Switch

Digital pressure gauge display & pressure switch with analogue output.

Available in standard and DESINA version with stylish rotatable casing and 4 digit easy to read pressure display. Optional with one or two independently programmable switching values and an analogue output of pressure values.

PS120 (formerly known as Multi-EPC)

Technical data

Measuring principle	piezo-resistive
Pressure type	relative pressure
Standard output signal	4 ... 20 mA / 0 ... 20 mA (settable)
DESINA output signal	4 ... 20 mA
Electrical measuring connector	5 pole device connector, M12 x 0.75
Mechanical measuring connector	ISO 228 – G ¼ A
Protection type (EN 60529 / IEC 529)	IP 67 (only with screwed cable box)
Switching outputs	2 Mosfet high side switch PNP
Contact function	closer / opener
Switching voltage (VDC)	Supply voltage minus 1.5 VDC
Switching current	max. 0.7 A / switch
Short-circuit current	2.4 A / switch
Material casing / Membrane	GD-ZnAl4Cu1/ 1.4542
Weight	~ 350 g
Supply voltage Ub	15 ... 30 VDC, nominal 24 VDC (ripple < 5 % VSS of UD)
Current consumption	< 100 mA
Error limit (of final value)	± 0.5 %
Response time	≥ 10 ms
Medium temperature	-20 ... +85 °C
Environmental temperature	-20 ... +85 °C
Storage temperature	-30 ... +100 °C
Mounting orientation	arbitrary

Options & Ordering Information

Measuring range		Order number	
bar	MPa	PS 120	PS 129 (DESINA)
0 ... 25	0 ... 2.5	3160-10-40.01	3160-11-40.02
0 ... 100	0 ... 10	3160-10-16.01	3160-11-16.02
0 ... 250	0 ... 25	3160-10-17.01	3160-11-17.02
0 ... 400	0 ... 40	3160-10-15.01	3160-11-15.02
0 ... 700	0 ... 70	3160-10-39.01	3160-11-39.02

Connection cables for PS120

pic 1

pic 2

Description	Picture	Measuring instrument	Length Meters	Part number
5 pin M12x1 to open cable ends	1	PS120 / PS129	2.0	8824-L0-02.00
90° 5 pin M12x1 to open cable ends	2	PS120 / PS129	2.0	8824-L1-02.00

SEG 1060 Fixed LED Display

The SEG 1060 is designed for fixed display & output of measurements from analogue or frequncy sensors. Compact panel mounting assure easy system integration with simple programming from the 4 front keys.

Channels	**1**
Analogue inputs	**1**
Frequency inputs	**1**
Switching outputs	**2**

Channels and outputs

Measuring channels, analog/frequency	1 (switchable)
Signals	0/4 ... 20 mA, 0 ... 10 V, 0 Hz ... 10 kHz
A/D converter	12 bit
Measuring rate	100 Hz (analog and f > 100 Hz), 1/f + 15 ms (f < 100 Hz)
Error limit	± 0.2 % FS + 1 digit
Electrical connection	clamping bar
Digital output channels	1 (option)
Signals	Relais output (opener / closer)
Max. load	250 VAC / 10 A
Reaction time	≤ 25 ms (standard signal), ≤ 0.5 Sek. (frequency > 4 Hz)
Analog output channels	1 (option)
Signals	0/4 ... 20 mA
D/A-converter	12 bit
Refresh rate	100 Hz or measuring rate
Error limits	± 0.3 % FS

Technical Specifications

Display	7-segment LED, red, 4-digit, height 14 mm
Power supply	230 VAC (type 1), 24 VDC (type 2)
Sensor power supply	24 V / 22 mA (type 1), 18 V / 35 mA (type 2), galvanically separated
Casing	ABS plastics
Dimensions (L x W x H)	115 x 48 x 96 mm
Front frame	48 x 96 mm
Weight	151 g (with option 182 g)
Protections type (front, mounted)	IP 54 (option IP 65)
Operation temperature	-20 ... +50 °C
Storage temperature	-30 ... +70 °C
Relative humidity	0 ... 80 % r. H. (not condensing)

Options & Ordering Information

Analogue input	Frequency input	Analog output	Threshold	Ub 24 VDC	Ub 230 VAC	
•	•	-	-	•	-	3192-04-10.00
•	•	•	•	•		3192-04-11.00
•	•	-	-	-	•	3192-04-20.00
•	•	•	•	-	•	3192-04-21.00

Many more fixed displays are available:-

- Low cost OEM displays with outputs
- Differential / Calculation displays
- Batching / Totalising displays

....please see our Display & Instrumentation section on page 170

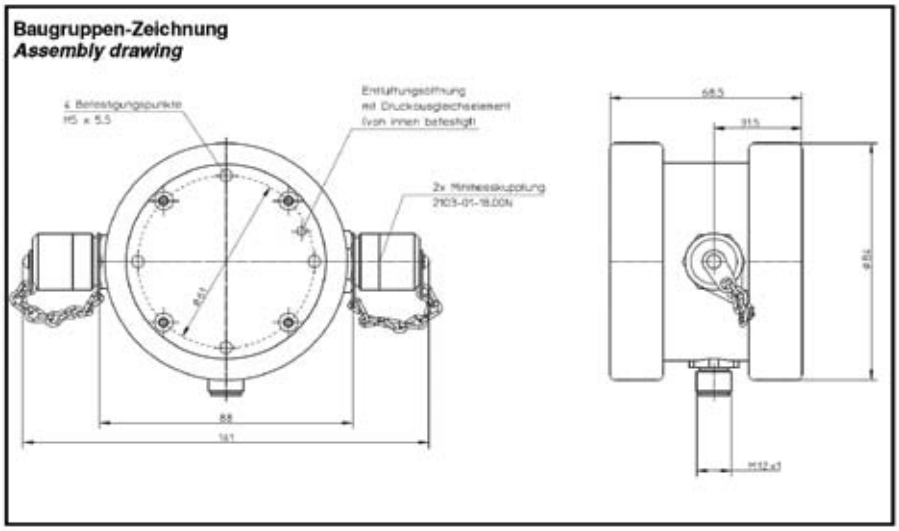
Patrick series in-line Particle Counter

Patrick ... the Particle Counter

Patrick is a laser particle counter giving ISO4406:99 or SAE A540595 cleanliness code readings all in one display.

Patrick is specifically designed to be a stand alone reader or integrated into our MultiSystem 5060 & HYDROlink software for log in & analysing of cleanliness data.

Dimensional Information



- Detects particles in liquids, especially trends and changes
- Recording and readout of current and historic measured values
- Monitoring and display of the volume flow rate range
- Rotatable display
- Easy operation & clear ISO or SAE cleanliness data
- Can connect to MultiSystem 5060 or 8050 for increased diagnostics

Technical Information

Max. operation pressure	420 bar (dynamic) / 600 bar (static)
Fluid operation temperature	-20 ... +85 °C
Environmental temperature / humidity	-20 ... +85 °C / 0 ... 95 %
Storage temperature / humidity	-20 ... +85 °C / 0 ... 95 %
Pressure fluids	Mineral and esther fluids, Polyalphaolefines
Wettened materials / sealing material	High-grade steel, Sapphire, Kalrez, PTFE
Power supply	9 ... 36 VDC
Current consumption	65 ... 180 mA (due to supply voltage)
Current output	4 ... 20 mA
Interfaces	RS 232, CANopen
Alarm contact	potential-free contact
Fluid connector	¼“, Minimess 1620
Electrical connector	8-pole plug, M12 x 1
Allowed volume flow	50 ... 500 ml/min
Measuring range	4 ... 25 (purity grade acc. to ISO 4406:99)
Measuring accuracy	± 0.5

Options & Ordering Information

Description	Part number
Patrick Particle Counter	3160-00-76.00
Multi Country Power Supply Unit M12x1	8812-00-00.36

Further accessories available. Contact your nearest dealer for more information