Measuring Systems

HYDROTECHNIK

Contents

Introduction

Continuity and innovation

Information is valuable, especially when it comes from inside complex technical structures and installations. Use them to maintain an overview of state, quality and preformance, it provides hints on potential critical incidents or failures.

Hydrotechnik is focussed on the collection, recording and evaluation of information, especially from hydraulic plants and systems. We are the developper of the Minimess® test point and numerous other innovations. We provide a complete and rounded range of products to out customers, where a suitable solution can be assembled for nearly each application. In short, we offer „systemic measuring".

When the standard product range proves not to be sufficient, a special Hydrotechnik strength becomes visible. We are a company with lean structures and quick decisions. This allows us to develop customer specific solutions and adaptations of our products in a fast and cost-effective way.

By the use of modern tools and methods in development, construction and production we are ready to react to customer requests and market developments quickly.

Quality – our number one priority

For Hydrotechnik, 'Quality without Compromise' is not just a statement. It is a working reality. All areas of the company adhere to maintaining ISO 9001 standards, certification of which was awarded in 1996. To ensure maximum quality control, Hydrotechnik practices the highest standards of manufacturing at our works in Limburg, Germany.

Hydrotechnik has its own personnel to develop hard- and software, prototyping and serial production is done by Hydrotechnik electronics GmbH, a 100 % subsidiary at the same location. This results in advantages during the phases of development, and for the feedback into serial production.

Where in-house production is not possible, we work with well-known suppliers. When choosing our supply partners, we do not just look at cost but we insist on the ability to achieve our priority of quality. Strict control of the supplied components ensures that the products fully comply with our quality standards.

Limitation of liability

The information contained in this catalog has been examined carefully. Nevertheless it is possible that printing or other errors are contained. Therefor we do not take any liability for the correctness of the contained information.

They must not be regarded as warranted characteristics, only the product descriptions contained in our offers are decisive. We reserve all changes due to the technical development and improvement of our products. All prior catalogs lose their validity.

The data contained in this catalog have to be seen as average values and are not binding. They can be used for constructional purposes in a limited way, only. Please ask for our technical data sheets and user manuals. The use of our products is at the sole responsibility of the customer. All deliveries are carried out solely on the basis of our conditions of sales and delivery. They can be accessed on our homepage www.hydrotechnik.com in the section „Impressum".

Instrument feature icons

You will find icons at each measuring system in this catalog that shall indicate the most important instrument features. Here are the explanations of the used icons:

Icon	Description
→A	instrument is equipped with at least one analog input channel
→f	instrument is equipped with at least one frequency input channel
A/f	instrument is equipped with at least one switchable input channel for analog or frequency
→D	instrument is equipped with at least one digital input channel
A→	instrument is equipped with at least one analog output channel
D→	instrument is equipped with at least one digital output channel
ISDS	instrument is equipped with the Intelligent Sensor Detection System (automatic programming of sensor parameters and calibration data)
Max ↑ ↓ Min	instrument is able to display min and max values
☀	display has background illumination
╴√⋀╮	instrument can display values graphically (line diagram)
3.6	instrument can display values numerically
💾	instrument has an internal memory
Trigger	instrument is equipped with trigger and/or pretrigger (to start recordings when defined conditions are fulfilled)

Icon	Description
USB	instrument has an USB interface
RS 232	instrument has an RS 232 interface
CAN	instrument can read-out, display and record data from a CAN bus
HC6 Base	instrument is equipped with **HYDRO**com 6 – Base version
HC6 Full	instrument is equipped with **HYDRO**com 6 – Full version
HYDRO link	instrument is equipped with **HYDRO**link
CAL	instrument will automatically remind the expiration of a defined calibration interval

Performance overview

MultiSystem measuring systems		MultiSystem 8050	MultiSystem 5060 *Plus*	MultiSystem 4010
Inputs	analog / incl. highspeed	12 / 2	6 / 2	3 / –
	frequency	4	2	1
	a/f switchable	–	–	1
	digital	4	1	1
	CAN	6 / 14 (opt.)	14	5 (opt.)
Outputs	digital	4	1	1
	analog	2	–	–
	relais	–	–	–
Calcualted measuring values	number	6 / 14 (opt.)	14	5
	sum / difference	● / ●	● / ●	● / ●
	performance	●	●	●
	dx / dt	●	●	●
	free formula definition	●	●	–
ISDS		●	●	●
Presentation	Nº of pres. channels	30	16	12
	graphically	y = f(t) / y = f(x)	y = f(t) / y = f(x)	y = f(t) / y = f(x)
	color	●	●	●
	memory presentation	●	●	●
Memory	scan rate	0.1 ms / 1 ms	0,1 ms	1 ms
	memory size / places	256 MB / 200	2 GB / 200	2 GB / 100
	trigger	●	●	●
	trigger link	●	●	–
	pretrigger	●	●	●
	cyclic recording	●	●	●
Operation	direct	–	–	–
	menu	●	●	●
	touchscreen	●	–	–
	PC operation / online mode	● / ●	● / ●	● / ●
Interfaces	USB	●	●	●
	RS 232	●	●	●
	RS 485	–	–	–
Linearisation		●	●	●
Channel filter	software / hardware filter	● / –	● / ●	● / –
Printer		●	●	–
Battery operation		–	●	●
A/D converter		16 bit	13 bit	12 bit

Performance overview

MultiBox and MultiHandy measuring instruments

		MultiBox 3060 / 3061 / 3065	MultiHandy 3020 / 3025	MultiHandy 2020
Inputs	analog / incl. highspeed	3 / –	2 / –	2 / –
	frequency	–	1	–
	a/f switchable	1	–	–
	digital	–	–	–
	CAN	–	–	–
Outputs	digital	–	–	–
	analog	–	–	–
	relais	–	–	–
Calcualted measuring values	number	2	1	1
	sum / difference	– / •	• / •	– / •
	performance	•	•	–
	dx / dt	–	•	–
	free formula definition	–	–	–
ISDS		•	•	•
Presentation	Nº of pres. channels	6[1]	4	3
	graphically	•[1]	–	–
	color	•[1]	–	–
	memory presentation	–	–	–
Memory	scan rate	1 ms	1 ms	1 ms
	memory size / places	2 GB / 200	2 MB / 14	128 kB / 1
	trigger	•	•	–
	trigger link	option	–	–
	pretrigger	•	•	–
	cyclic recording	–	–	–
Operation	direct	–	•	•
	menu	–	•	•
	touchscreen	–	–	–
	PC operation / online mode	• / •	– / •	– / •
Interfaces	USB	•	•	•[2]
	RS 232	–	–	–
	RS 485	–	–	–
Linearisation		•	•[3]	•[3]
Channel filter	software / hardware filter	–	–	–
Printer		•[1]	–	–
Battery operation		option	•	•
A/D converter		12 bit	12 bit	12 bit

1: via PC
2: virtual COM interface
3: only with ISDS

Performance overview

		MultiPanel 8050	SEG 1060	MultiEPC
Stationary measuring systems				
Inputs	analog / incl. highspeed	12 / 2	1 / –	1 / –
	frequency	4	1	–
	a/f switchable	–	–	–
	digital	4	–	–
	CAN	6 / 14 (opt.)	–	–
Outputs	digital	4	–	–
	analog	2	1	1
	relais	–	1	1 / 2
Calcualted measuring values	number	6 / 14 (opt.)	–	–
	sum / difference	• / •	–	–
	performance	•	–	–
	dx / dt	•	–	–
	free formula definition	•	–	–
ISDS		•	–	–
Presentation	N° of pres. channels	0 / 8 / 16 (30[1])	1	1
	graphically	y = f(t) / y = f(x)[1]	–	–
	color	•[1]	–	–
	memory presentation	•[1]	–	–
Memory	scan rate	0.1 ms / 1 ms	–	–
	memory size / places	256 MB / 200	–	–
	trigger	•	–	–
	trigger link	•	–	–
	pretrigger	•	–	–
	cyclic recording	•	–	–
Operation	direct	–	•	–
	menu	–	–	•
	touchscreen	–	–	–
	PC operation / online mode	• / •	–	–
Interfaces	USB	•	–	–
	RS 232	•	–	–
	RS 485	–	–	–
Linearisation		•	–	–
Channel filter	software / hardware filter	• / –	–	–
Printer		•	–	–
Battery operation		–	–	–
A/D converter		16 bit	12 bit	12 bit

1: via PC

MultiSystem

MultiSystem are high end measuring systems with a complete range of functions for all applications.

With numerous channels for several input signals and measurands and the possibility of internal and external trigger control. You may execute real-time calculations on virtual channels, or display and record sensor signals from a CAN bus.

MultiSystem instruments (not MultiSystem 4010) are able to run pre-defined test sequences and to record the results in a fool-proof way. Use the **MultiXtend** extension modules to increase measuring systems to individual applications.

Unlimited Possibilities

MultiSystem/MultiControl 8050

MultiSystem 5060 *Plus*

MultiSystem 4010

Up to ten analog sensors with up to 10,000 values logged per second

up to four sensors with frequency input signal

further sensors and input signals via CAN bus

MultiXtend extension modules for more channels, further input signals or additional functions

MultiSystem 8050

This measuring system is incomparable: all values are displayed clearly on the large touchscreen, either numerically or as line diagram. This adds to the unique flexibility by the variety of inputs and outputs.

✓ **Everything visible:**
up to 30 channels on the TFT monitor simultaneously

✓ **Live analysis of measuring data:**
huge graphic display for perfect line diagrams

✓ **High end measuring system:**
HighSpeed inputs and various filter functions

✓ **Universal use:**
analog and digital inputs and outputs, many interfaces

✓ **Outstanding operational concept:**
touchscreen monitor and logical menu structure

MultiControl 8050
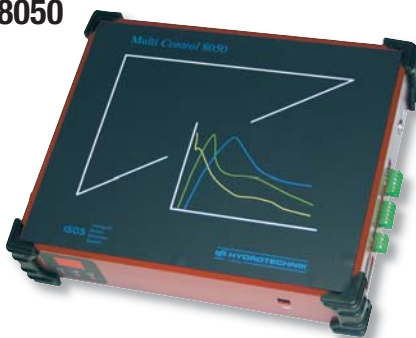
If you always have a notebook with you, this version without display will surely meet your needs as a completely equipped measuring box. With identic performance to the MultiSystem 8050 you connect the MultiControl with your PC via USB or Ethernet. The operation is done in an easy and comfortable way with the software package **HYDRO**_link_ that comes free of charge with the instrument.

MultiPanel 8050

The sophisticated measuring electronics of the MultiSystem 8050 is available in a 19" rack casing to equip test benches and measuring laboratories. Either with 8 or 16 displays you have everything visible. The connection to a PC is done with the software package **HYDRO-**_link_ that is part of the delivery.

MultiSystem 8050 Technical Data

Inputs / outputs / channels

Analog input channels	8x standard, 2x HighSpeed (for sensors with or without Hydrotechnik ISDS)
Signals	0/4 ... 20 mA • 0 ... 10 V • ± 10 V
A/D converter	16 bit
HighSpeed measuring rate	10,000 values per second
Standard measuring rate	1,000 values per second
Error limits	± 0.1 % FS
Frequency input channels	4x (for sensors with or without Hydrotechnik ISDS)
Signals	0.05 Hz ... 20 kHz (w.o.D.) • 0.05 Hz ... 5 kHz (w.D.)
Measuring rate	1 kHz
Error limits	± 0.2 % mv
Digital inputs	4x, 3.5 ... 30 VDC (1x separated galvanically)
Measuring rate	1,000 values per second
Current measuring input	± 2 A DC
Voltage measuring input	± 48 V DC
A/D converter	12 bit
Digital output	4x NPN transistor output
max. load	≤ 30 VDC / 10 mA
Reaction time	≤ 1 ms
Analog output	2x, 0 ... 20 mA (channel 25) • ± 20 mA (channel 26)
D/A converter	12 bit
Electrical measuring conn.	6-pole jack, compatible to DIN 45 322, IEC 60130-9
Special channels	6x (option 14x)
Calculations	difference, sum, hydraulic power, CAN, ...
Free formula input	yes
CAN measuring rate	100 values per second
CAN protocols	CANopen, SAE J1939, ...
Filter functions	several software filters

Data memory

Type	CF card 256 MB
Measuring series	200
Values per measuring series	6,000,000
Recording rate	0.1 ms ... 999 Min. (settable)
Recording time	1 s ... 999 h (settable)
Trigger	2x (option 6x), linkable (bigger, smaller, rising / falling flange)
Pre trigger	0 / 10 / 20 / ... 100 %

MultiSystem 8050 Technical data

Equipment

Electrical meas. connector	M 16 x 0.75, 6 pole (compatible with DIN 45 322 / IEC 60130-9)
Interfaces	USB 1.1 device • RS 232 • Centronics • CAN • LVDS
Power supply	power pack 24 V DC, 2 A
Sensor power supply	18 VDC, 100 mA
CAN / MX power supply	not possible

Qualities

Casing	steel plates with edge protectors
Dimensions	~ 310 x 254 x 60 mm (L x W x H)
Weight	~ 3,100 g
Protection type	IP 40
Operation temperature	0 ... +40 °C (MS 8050) / 0 ... +60 °C (MC 8050)
Allowed humidity	≤ 80 % r.h. (not condensing)
Storage temperature	-20 ... +60 °C

MultiSystem 8050 Order data

Single unit

Range of delivery	Order number
MultiSystem 8050	3160-00-65.00
MultiControl 8050	3160-00-66.00
MultiPanel 8050 (8 displays)	3165-11-01.00
MultiPanel 8050 (16 displays)	3165-11-02.00
• Power pack • USB cord • Data CD • **HYDRO**com 6 Full, 3 licenses • **HYDRO**link	

MultiSystem 8050 Accessories

Power supply

Power pack (table), 110 ... 240 VAC, 47 ... 63 Hz – 24 V DC, 53 W	8812-00-00.27
Car connector cable, 12 ... 24 VDC, length 5.0 m	8824-79-05.00

Cables

Measuring cables are contained in the chapter „Accessories"

CAN connection cable, D-sub plug (9 pole) – M12 x 1 jack (8 pole), 5.0 m		8824-N1-05.00
CAN connection cable, D-sub plug (9 pole) – open cable ends, 1.5 m		8824-M6-01.50
HYDRO*boot* connection cable, 1.5 m		8824-F8-01.50
Patrick connection cable D-sub plug (9 pole) – M12 x 1 jack (8 pole) Y distributor and separate power supply required (see Patrick accessories)	2.5 m	8824-T3-02.50
	5.0 m	8824-T3-05.00
	10.0 m	8824-T3-10.00
Trigger cable, MS/MC 8050 – MS/MC 8050, 0.5 m		8824-F2-00.50
USB cable, 2.0 m		8824-F4-02.00

Others

Nylon bag, black	8875-01-06.00
Transportation case, aluminium, red, with bottom compartment	3160-00-65.03
Data CD, software and operation instructions manual	8874-16-00.01
HYDRO*com* 6, program version Professional, 3 licenses	8874-19-01.01
HYDRO*com* 6, program version Full, 3 licenses	8874-19-01.02
HYDRO*link*, 1 license	8874-00-07.01
HYDRO*gen* / **HYDRO***run*, 1 license	8874-01-01.55

Calibration and Service

Calibration, single channels or as measuring chain with sensors (option)	3199-12-00.11
Service package Basic	3199-30-00.04
Service package Plus	3199-30-01.08
Service package Professional	3199-30-02.08

MultiSystem 5060 *Plus*

The mobile all rounder: the perfect mobile measuring system with 24 channels, 2 GB data memory and powerful operating software. Use the graphic display to analyse measurements during recording, download measuring data fast and easy to a USB stick.

✓ **For all measuring tasks:**
  flexible hand held instrument with huge functionality

✓ **Large display:**
  impressive graphical performance with high resolution

✓ **Live analysis of measuring data:**
  descriptive line diagrams with zoom function

✓ **Robust construction:**
  shock-resistant casing with rigid connectors

✓ **Highest flexibility:**
  24 channels for freely definable measurands

MultiSystem 5060 *Plus* Technical data

Inputs, outputs and channels

Analog input channels	4x standard, 2x HighSpeed (for sensors with or without Hydrotechnik ISDS)
Signals	0/4 ... 20 mA • 0/1/2 ... 10 V • 0.5 ... 4.5 V • ± 10 V
A/D converter	13 bit
Meas. rate HighSpeed	10,000 values per second
Meas. rate standard	1,000 values per second
Error limits	± 0.15 % FS
Frequency input channels	2x (for sensors with or without Hydrotechnik ISDS)
Signals	0.25 Hz ... 20 kHz (w.o.D.) • 0.25 Hz ... 5 kHz (w.D.)
Measuring rate	10 ns
Error limits	± 0.02 % MV
Digital input	1x, galvanically separated, 3.5 ... 30 VDC
Measuring rate	1,000 values per second
Digital output	1x
max. load	Ub / 10 mA
reaction time	≤ 1 ms
Elektrical meas. connector	6 pole jack, compatible to DIN 45 322, IEC 60130-9
Special channels	14x
Calculations	difference, sum, hydraulic power, CAN, ...
Free definable formulas	yes
CAN measuring rate	100 values per second
CAN protocols	CANopen, SAE J1939, ...
Filter functions	Hardware- (low-pass) and several software filters

Data memory

Type	Micro SD card 2GB
Measuring series	200
Values per measuring series	2,000,000
Recording rate	1 ms ... 999 min. (settable)
Recording time	1 s ... 999 h (settable)
Trigger	2x, linkable (bigger, smaller, falling/rising edge)
Pretrigger	0 / 10 / 20 / ... 100 %

MultiSystem 5060 *Plus* Technical data

Equipment

Interfaces	USB 2.0 device • USB 2.0 host • RS 232
Battery power supply	NiMH batteries, 14.4 VDC, 2,150 mAh
Battery operation	max. 8 h
Mains operation power supply	12 ... 30 VDC
Sensor power supply	13 (battery operation) ... 22 (mains operation) VDC, 100 mA
CAN / MX power supply	Vs+ VDC, 180 ... 200 mA

Qualities

Casing	Plastic PC + ABS + 20GF
Dimensions	~ 270 x 140 x 69 mm (L x W x H)
Weight	~ 1,277 g
Protection type	IP 40
Temperature – operation	-10 ... +50 °C @ max. 80 % r.h., not condensing
– storage	-20 ... +50 °C

MultiSystem 5060 *Plus* Order data

Single unit

Range of delivery	Order N°
MultiSystem 5060 Plus	3160-00-79.00
• Power pack • USB cable • Data CD • **HYDRO***com* 6 Full, 3 licenses	

Measuring sets

PR 400

TE 100

QT 100

Pressure measurement	Order N°
Version C • All components of the single unit • 2x HySense® PR 400 pressure sensor • 2x Minimess® direct connector 1620 • 2x measuring cable standard, 5.0 m • Plastic case, black	5060C-pp-xx[1]-xx[1] 1: see below for measuring range codes

MultiSystem 5060 *Plus* Order data

Measuring sets

Pressure and temperature measurement	Order Nº
Version C	5060C-ppT-xx[1]-xx[1]
• All components of the single unit	
• 2x HySense® PR 400 pressure sensor	
• 1x HySense® TE 100 temperature sensor	
• 2x Minimess® direct connector 1620	
• 3x measuring cables standard, 5.0 m	1: see below for measuring range codes
• Plastic case, black	

Measure pressure, temperature and volume flow rate	Order Nº
Version C	5060C-ppTQ-xx[1]-xx[1]-yy[2]
• All components of the single unit	
• 2x HySense® PR 400 pressure sensor	
• 2x Minimess® direct connector 1620	
• 1x HySense® TE 100 temperature sensor	
• 1x HySense® QT 100 volume flow rate sensor	1: see below for measuring range codes
• 4x measuring cables standard, 5.0 m	2: see below for measuring range codes
• Plastic case, black	

Measuring ranges PR 400	Code	Measuring ranges QT 100	Code
0 ... 600 bar | 0 ... 8,700 psi	18	16 ... 600 l/min | 4.25 ... 158.5 gpm	72
0 ... 400 bar | 0 ... 5,800 psi	15	9 ... 300 l/min | 2.35 ... 79.25 gpm	71
0 ... 200 bar | 0 ... 2,900 psi	10	2 ... 75 l/min | 0.5 ... 19.8 gpm	70
0 ... 60 bar | 0 ... 870 psi	21	1 ... 10 l/min | 0.26 ... 2.6 gpm	01

Measuring set 5060C-ppTQ with sensors for pressure, temperature and volume flow rate, Minimess® connectors and accessories; the image shows optional components, like additional sensors, Patrick the particle counter and a MultiXtend module.

MultiSystem 5060 *Plus* Accessories

Power supply

Power pack (plug version), 115 ... 230 VAC	8812-20-02.00
Power pack (table version), 115 ... 230 VAC	8812-02-01.00
Car connection cable, 12 VDC, 5.00 m	8824-64-05.00
Batteries	8873-07-01.00

Cables

Measuring cables are contained in the section „Accessories"

CAN connection cable, plug – jack M12 x 1 (5 pole), for MultiXtend, 5.0 m		8824-R7-05.00
CAN connection cable, plug M12 x 1 (8 pole), open cable ends, 1.5 m		8824-R9-01.50
Multimeter connection cable, M12 x 1, 2.0 m		8824-R6-02.00
HYDRO*boot* connection cable, 2.0 m		8824-R5-02.00
Patrick connection cable plug – jack M12 x 1 (8 pole) Y distributor required (see Patrick accessories)	2.5 m	8824-T2-02.50
	5.0 m	8824-T2-05.00
	10.0 m	8824-T2-10.00
Patrick connection cable plug – plug M12 x 1 (8 pol), use without Y distributor, power supply from measuring instrument	2.5 m	8824-T6-02.50
	5.0 m	8824-T6-05.00
	10.0 m	8824-T6-10.00
USB cable, USB-A – USB-B, 2.0 m		8824-F4-02.00

Others

DIN rail mounting set, clip + rail + screws	8854-00-00.02
Velcro strip mounting set, 5 pieces	8840-00-00.13
Neck strap set, with fixing	8854-00-00.01
Data CD, software and operating instructions manual	8874-16-00.01
Plastic case, black, with compartments for turbine, Patrick, MultiXtend	8859-02-02.03
Plastic case, red, with foam inlays	8854-15-00.14K
Leather bag (art.), with see-through panel	8875-01-07.00
HYDRO*com* 6, program version Professional, 3 licenses	8874-19-01.01
HYDRO*com* 6, program version Full, 3 licenses	8874-19-01.02

Calibration and Service

Calibration, single channels or as measuring chain with sensors (option)	3199-12-00.11
Service package Basic	3199-30-00.03
Service package Plus	3199-30-01.06
Service package Professional	3199-30-02.06

MultiSystem 4010

The entry to complexity: the handy mobile measuring system that has 12 channels and can meet the demands of ambitious measuring technicians. With its professional functions it is suited for complex measuring tasks at small and medium-sized systems, but also for the fast measurement anywhere you are.

✓ **For all measuring tasks:**
   flexible hand-held device with large functionality

✓ **Live analysis of measuring data:**
   large graphic display for clear line diagrams

✓ **Robust construction:**
   shock-resistant casing with rigid connectors

✓ **Easy operation:**
   one hand operation concept and self explanatory menus

✓ **Highest flexibility:**
   12 channels and 37 measurands

MultiSystem 4010 Technical data

Inputs, outputs and channels

Analog input channels	3x (for sensors with or without Hydrotechnik ISDS)
Signals	0/4 ... 20 mA • 0/2 ... 10 V
A/D converter	12 bit
Measuring rate	1,000 values per second
Error limits	± 0.2 % FS
Frequency input channels	1x (for sensors with or without Hydrotechnik ISDS)
Signals	0,25 Hz ... 20 kHz (w.o.D.) / 0.25 ... 5 kHz (w.D.)
Measuring rate	1,000 values per second
Error limits	± 0.02 % MW
Switchable input channels	1x analog / frequency (for sensors with or without Hydrotechnik ISDS)
Qualities	see above
Digital input	1x, separated galvanically
Measuring rate	1,000 values per second
Digital output	1x
max. load	Ub / 10 mA
Reaction time	≤ 1 ms
Electrical meas. connector	6 pole jack, compatible to DIN 45 322, IEC 60130-9
Special channels	5x
Calculations	difference, sum, hydraulic power, CAN (option)
CAN measuring rate	100 values per second
CAN protocols	CANopen, SAE J1939, ...

Data memory

Type	Micro SD card 2GB
Measuring series	100
Values per series	1,000,000
Recording rate	1 ms ... 999 Min. (settable)
Recording time	1 s ... 999 h (settable)
Trigger	1x (bigger, smaller, rising/falling edge)
Pretrigger	0 / 10 / 20 / ... 100 %

Equipment

Interface	USB 2.0 / FS device
Battery power supply	NiMH batteries, 14.4 VDC, 1,100 mAh
Battery operation time	max. 6 h
Mains power supply	12 ... 30 VDC
Sensor power supply	14 ... 22 VDC, 100 mA
CAN / MX power supply	Vs+ VDC, 200 mA

MultiSystem 4010 Technical data

Qualities

Casing	Plastic PC + ABS + 20GF
Dimensions	~ 225 x 128 x 63 mm (L x W x H)
Weight	~ 841 g
Protection type	IP 40
Temperature – operation	0 ... +50 °C @ max. 80 % r.h., not condensing
– storage	-10 ... +70 °C

MultiSystem 4010 Order data

Single unit

Range of delivery	Order No
MultiSystem 4010 MultiSystem 4010, option CAN	3160-00-75.00 3160-00-75.10
• Power pack • USB cable • Data CD • **HYDRO**com 6 Full, 3 licenses	

Measuring sets

PR 100	PR 101	TE 100	QT 100

Pressure measurement	Order Nº
Version A • All components of the single unit (without option CAN) • 2x HySense® PR 100 pressure sensor • 2x Minimess® direct connector 1620 • 2x measuring cable standard, 5.0 m • Plastic case, black	4010A-pp-xx[1]-xx[1] 1: see below for measuring range codes
Version B • All components of the single unit (without option CAN) • 2x HySense® PR 101 pressure sensor • 2x measuring cable standard, 5.0 m • Plastic case, black	4010B-pp-xx[1]-xx[1] 1: see below for measuring range codes

MultiSystem 4010 Order data

Measuring sets

Pressure and temperature measurement	Order Nº
Version A • All components of the single unit (without option CAN) • 2x HySense® PR 100 pressure sensor • 1x HySense® TE 100 temperature sensor • 2x Minimess® direct connector 1620 • 3x measuring cable standard, 5.0 m • Plastic case, black	4010A-ppT-xx[1]-xx[1] 1: see below for measuring range codes
Version B • All components of the single unit (without option CAN) • 2x HySense® PR 101 Drucksensor • 1x HySense® TE 100 temperature sensor • 3x measuring cable standard, 5.0 m • Plastic case, black	4010B-ppT-xx[1]-xx[1] 1: see below for measuring range codes

Measuring of pressure, temperature and volume flow rate	Order Nº
Version A • All components of the single unit (without option CAN) • 2x HySense® PR 100 pressure sensor • 2x Minimess® direct connector 1620 • 1x HySense® TE 100 temperature sensor • 1x HySense® QT 100 volume flow rate sensor • 4x measuring cable standard, 5.0 m • Plastic case, black	4010A-ppTQ-xx[1]-xx[1]-yy[2] 1: see below for measuring range codes 2: see below for measuring range codes
Version B • All components of the single unit (without option CAN) • 2x HySense® PR 101 pressure sensor • 1x HySense® TE 100 temperature sensor • 1x HySense® QT 100 volume flow rate sensor • 4x measuring cable standard, 5.0 m • Plastic case, black	4010B-ppTQ-xx[1]-xx[1]-yy[2] 1: see below for measuring range codes 2: see below for measuring range codes

Meas. ranges PR 100 / PR 101	Code	Measuring ranges QT 100	Code
0 ... 600 bar | 0 ... 8,700 psi	18	16 ... 600 l/min | 4.25 ... 158.5 gpm	72
0 ... 400 bar | 0 ... 5,800 psi	15	9 ... 300 l/min | 2.35 ... 79.25 gpm	71
0 ... 200 bar | 0 ... 2,900 psi	10	2 ... 75 l/min | 0.5 ... 19.8 gpm	70
0 ... 60 bar | 0 ... 870 psi	21	1 ... 10 l/min | 0.26 ... 2.6 gpm	01
-1 ... +6 bar | -14 ... +87 psi	32		

Measuring set 4010A-ppTQ with sensors for pressure, temperature and volume flow rate, Minimess® connectors and accessories; the image shows optional components, like additional sensors, Patrick the particle counter and a MultiXtend module.

MultiSystem 4010 Accessories

Power supply

Power pack (plug version), 115 … 230 VAC	8812-20-02.00
Power pack (table version), 115 … 230 VAC	8812-01-01.00
Car connection cable, 12 VDC, 5.0 m	8824-64-05.00
Batteries	8873-08-02.00

Cables

Measuring cables are contained in the chapter „Accessories"

CAN connection cable, plug – jack M12 x 1 (5 pole), for MultiXtend, 5.0 m		8824-R7-05.00
CAN connection cable, plug M12 x 1 (8 pole), open cable ends, 1.5 m		8824-R9-01.50
Multimeter connection cable, M12 x 1, 2.0 m		8824-R6-02.00
HYDRO_boot_ connection cable, 2.0 m		8824-R5-02.00
Patrick connection cable plug – jack M12 x 1 (8 pole) Y distributor required (see Patrick accessories)	2.5 m	8824-T2-02.50
	5.0 m	8824-T2-05.00
	10.0 m	8824-T2-10.00
Patrick connection cable plug – plug M12 x 1 (8 pole) use without Y distributor power supply by measuring instrument	2.5 m	8824-T6-02.50
	5.0 m	8824-T6-05.00
	10.0 m	8824-T6-10.00
USB cable, USB-A – Micro-USB-B, 2.0 m		8824-R4-02.00

Others

DIN rail mounting set, clip + rail + screws	8854-00-00.02
Velcro strip mounting set, 5 pieces	8840-00-00.13
Neck strap set, with fixing	8854-00-00.01
Data CD, software and operating instructions manual	8874-16-00.01
Plastic case, black, with compartments for turbine, Patrick, MultiXtend	8859-02-02.03
Plastic case, red, with foam inlays	8854-15-00.14K
HYDRO_com_ 6, program version Professional, 3 licenses	8874-19-01.01
HYDRO_com_ 6, program version Full, 3 licenses	8874-19-01.02

Calibration and Service

Upgrade MultiSystem 4010 with option „CAN"	3199-30-03.02
Calibration, single channels or as measuring chain with sensors (option)	3199-12-00.11
Service package Basic	3199-30-00.03
Service package Plus	3199-30-01.09
Service package Professional	3199-30-02.09

MultiHandy + MultiBox

MultiHandy are robust measuring devices, developed for daily diagnosis at small to medium sized systems. They are easy to operate and very reliable, equipped with two or three measuring inputs and a virtual channel for live calculations. Data download and PC connection via USB are standard, just as long battery performance and ISDS to automatically detect connected sensors are standard also.

MultiBox is the name of our measuring boxes for the use with a PC or Laptop. The basic version **MultiBox** 3060 is a measuring box without memory and can be operated without power pack. The **MultiBox** 3061 has an internal memory and due to its robustness it is very well suited for field measurements and tests under difficult environmental conditions. With its Ethernet interface, the **MultiBox** 3065 can be integrated into network architectures and programmed and operated with the **HYDRO**work supplied with all instruments.

MultiBox 3060

MultiBox 3061

MultiBox 3065

MultiHandy 3020

MultiHandy 2020

Up to four analog sensors with up to 1,000 values logged per second

One sensor with frequency input signal

MultiXtend extensions modules for more input signals or additional functions

MultiBox 3060 / 3061 / 3065

Whether as a measuring box connected to a PC or as an independant data logger, highest flexibility and perfect protection against environmental conditions make the **MultiBox** measuring instrument the universal solution for many industrial measuring tasks.
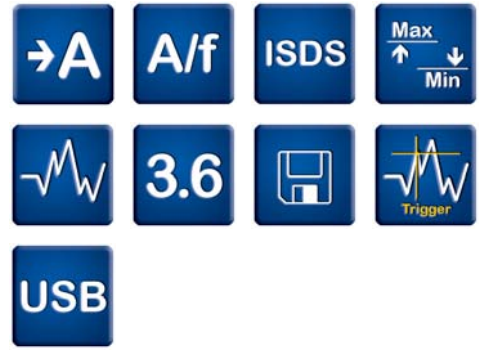
✓ **Fits perfectly:**
three types and six versions

✓ **Very easy to use:**
power supply and data transfer via USB

✓ **Universal use:**
measuring box via PC or an independant data logger

✓ **Robust construction:**
protected acc. to IP 54 in a stable casing (not MB 3065)

✓ **Complete software package:**
remote control, online measuring, data analysis and evaluation

✓ **Complete system integration:**
compatible with all Hydrotechnik measuring products

Versionen

MultiBox 3060
with USB interface the indispensable companion of your laptop: fully fledged measuring device with user-friendly software

MultiBox 3061
like MultiBox 3060, but with internal data memory and connector for power pack or battery pack: measuring box and data logger in one

MultiBox 3065
like MultiBox 3061, but with Ethernet interface for seamless integration into networks and plant controls

HYDROwork

The comfortable operation software to use all functions of the MultiBox. Easy programming of the device parameters, clear visualisation of the measuring results and fast recording of all data are the most important features.

MultiBox 3060 / 3061 / 3065 Technical data

Inputs and channels

Analog input channels	**3x** (for sensors with or without Hydrotechnik ISDS)
Signals	**0/4 ... 20 mA** or **0/2 ... 10 V** (due to device version)
A/D converter	12 bit
Measuring rate	1,000 values per second
Error limits	± 0,1 % FS
Switchable input channel	**1x** (for sensors with or without Hydrotechnik ISDS)
Signals	**0/4 ... 20 mA** or **0/2 ... 10 V** (due to device version) **1.0 Hz ... 5 kHz** (w.D.) or **1.0 Hz ... 10 kHz** (w.o.D.)
Measuring rate	1,000 values per second
Error limits	± 0.2 % of measured value
Elektrical meas. connector	6 pole jack, compatible to DIN 45 322, IEC 60130-9
Special channels	2x
Calculations	difference, hydraulic power

Data memory

not MultiBox 3060

Type	SD-Karte 2 GB
Measuring series	200
Values per series	**36,000,000** (data logger) / **15,000,000** (PC mode)
Recording rate	**1 ms ... 1 min.** (settable in steps)
Recording time	**1 s ... 48 h** (settable in steps)
Trigger	**1x** (option 4x, linkable)
Pretrigger	0 / 10 / 20 / ... 100 %

Equipment

Interface	USB 2.0 / FS device
Power supply	**5.0 VDC** (via USB)
Mains power supply	**9 ... 30 VDC** (option, only for MB 3061 and 3065)
Current consumption	**< 500 mA** (MB 3060) / **< 600 mA** (MB 3061 and 3065)
Sensor current consumption	max. 100 mA (sum)

Qualities

Casing	Aluminium with protected edges and corners
Dimensions	**~ 120 x 124 x 52 mm** (L x W x H)
Weight	**~ 492 g** (MB 3060) / **~ 520 g** (MB 3065)
Protection type	**IP 54** (MB 3060 and 3061) / **IP 40** (MB 3065)
Temperature – operation	**-35 ... +60 °C** (MB 3060 and 3061) / **0 ... +50 °C** (MB 3065)
– storage	-40 ... +70 °C

MultiBox 3060 / 3061 / 3065 Order data

Single unit

Range of delivery	Order Nº
MultiBox 3060, measuring box, input signal mA	3160-00-00.85
MultiBox 3060, measuring box, input signal V	3160-00-00.95
MultiBox 3061, USB data logger, input signal mA	3160-00-00.86
MultiBox 3061, USB data logger, input signal V	3160-00-00.96
MultiBox 3065, USB/Ethernet data logger, input signal mA	3160-00-00.87
MultiBox 3065, USB/Ethernet data logger, input signal V	3160-00-00.97
• USB cable • **HYDRO**_work_ • **HYDRO**_com_ 6 Base	

Measuring sets

| PR 100 | PR 101 | TE 100 | QT 100 |

Pressure measurement	Order Nº
Version A • All components of the single unit (input signal mA) • 2x HySense® PR 100 pressure sensor • 2x Minimess® direct connector 1620 • 2x measuring cable standard, 5.0 m • Plastic case, black	3060A-pp-xx[1]-xx[1] 3061A-pp-xx[1]-xx[1] 3065A-pp-xx[1]-xx[1] 1: see below for measuring range codes
Version B • All components of the single unit (input signal mA) • 2x HySense® PR 101 pressure sensor • 2x measuring cable standard, 5.0 m • Plastic case, black	3060B-pp-xx[1]-xx[1] 3061B-pp-xx[1]-xx[1] 3065B-pp-xx[1]-xx[1] 1: see below for measuring range codes

Pressure and temperature measurement	Order No
Version A • All components of the single unit (input signal mA) • 2x HySense® PR 100 pressure sensor • 1x HySense® TE 100 temperature sensor • 2x Minimess® direct connector 1620 • 3x measuring cable standard, 5.0 m • Plastic case, black	3060A-ppT-xx[1]-xx[1] 3061A-ppT-xx[1]-xx[1] 3065A-ppT-xx[1]-xx[1] 1: see below for measuring range codes
Version B • All components of the single unit (input signal mA) • 2x HySense® PR 101 pressure sensor • 1x HySense® TE 100 temperature sensor • 3x measuring cable standard, 5.0 m • Plastic case, black	3060B-ppT-xx[1]-xx[1] 3061B-ppT-xx[1]-xx[1] 3065B-ppT-xx[1]-xx[1] 1: see below for measuring range codes

Mess-Sets

3061A-ppTQ

Pressure, temperature and volume flow rate measurement	Order Nº
Version A • All components of the single unit (input signal mA) • 2x HySense® PR 100 pressure sensor • 2x Minimess® direct connector 1620 • 1x HySense® TE 100 temperature sensor • 1x HySense® QT 100 volume flow rate sensor • 4x measuring cable standard, 5.0 m • Plastic case, black	3060A- 3061A- 3065A- ppTQ-xx[1]-xx[1]-yy[2] 1: see below for measuring range codes 2: see below for measuring range codes
Version B • All components of the single unit (input signal mA) • 2x HySense® PR 101 pressure sensor • 1x HySense® TE 100 temperature sensor • 1x HySense® QT 100 volume flow rate sensor • 4x measuring cable standard, 5.0 m • Plastic case, black	3060B- 3061B- 3065B- ppTQ-xx[1]-xx[1]-yy[2] 1: see below for measuring range codes 2: see below for measuring range codes

Meas. ranges PR 100 / PR 101	Code	Measuring ranges QT 100	Code
0 ... 600 bar | 0 ... 8,700 psi	18	16 ... 600 l/min | 4.25 ... 158.5 gpm	72
0 ... 400 bar | 0 ... 5,800 psi	15	9 ... 300 l/min | 2.35 ... 79.25 gpm	71
0 ... 200 bar | 0 ... 2,900 psi	10	2 ... 75 l/min | 0.5 ... 19.8 gpm	70
0 ... 60 bar | 0 ... 870 psi	21	1 ... 10 l/min | 0.26 ... 2.6 gpm	01
-1 ... +6 bar | -14 ... +87 psi	32		

Accessories

Measuring cables are contained in the chapter „Accessories"

MultiBox 3065
with battery pack

Car connection cable, 12 VDC, 5.0 m	8824-P5-05.00
Power supply cable 250 V, open cable ends, 5.0 m	8824-P6-05.00
USB data cable, IP 67, USB-A – Mini-USB-B, 2.0 m	8824-P4-02.00
Measuring cable, IP 67, M16 x 0.75, 6 pole, 5.0 m	8824-S9-05.00
Power pack (plug version), IN: 110 ... 240 VAC, 47 ... 63 Hz / OUT: 24 VDC, 625 mA	8812-00-00.35
Transportation case, black, with turbine compartment	3160-00-62.09
Battery pack, ~ 2,000 mAh; IN: 24 VDC, 600 mA / OUT: 14.4 VDC	8873-30-01.00
Data CD, software and operation instructions manual	8874-16-00.01
Calibration, single channels or as measuring chain with sensors (option)	3199-12-00.11
Service package Basic	3199-30-00.02
Service package Plus	3199-30-01.04
Service package Professional	3199-30-02.04

MultiHandy 3020 / 3025

This device has three input channels, a robust casing and the USB interface and covers the basic demands of mobile measuring data collection in a reliable way. Calculations can be executed in real time on an additional channel. This allows to determine, display and record Δp fast and easy.

MultiHandy 3020

✓ **Very flexible:**
two analog and one frequency input channel

✓ **High operation friendliness:**
large keys, illuminated display

✓ **Very suitable for daily use:**
robust construction in Aluminium casing

✓ **Large internal memory:**
for est. one million measured values

✓ **Powerful batteries:**
measure the whole day without re-charging

✓ **Individual:**
also available with capacitive keypad

MultiHandy 3025

MultiHandy 3025: identical measuring device, but with capacitive keypad and newly designed operation area. Eases one-hand operation and accelerates the scrolling of menu parameters.

MultiHandy 3020 / 3025 Technical data

Inputs and channels

Analog input channels	**2x** (for sensors with or without Hydrotechnik ISDS)
Signals	0/4 ... 20 mA
A/D converter	12 bit
Measuring rate	1,000 values per second
Error limits	± 0.2 % FS
Frequency input channels	**1x** (for sensors with or without Hydrotechnik ISDS)
Signals	0.25 Hz ... 5 kHz
Measuring rate	1 kHz
Error limits	± 0.2 % of measured value
Electrical meas. connector	6 pole jack, compatible to DIN 45 322, IEC 60130-9
Special channels	1x
Calculations	difference, sum, 1. derivation, hydraulic power

Data memory

Type	Flash 2 MB
Measuring series	14
Values per series	1,000,000 (analog) / 333,000 (frequency)
Recording rate	1 ms ... 10 min. (settable)
Recording time	1 s ... 999 h
Trigger	1x
Pretrigger	0 ... 100 %

Equipment

Display	2.1" LCD, illuminated
Interface	USB 2.0 / FS device
Power supply – mains	Power pack 24 VDC / 340 mA
– batteries	NiMH / 14.4 V / 1,100 mAh
– battery performance	max. 16 h
– sensors	> 13 V (battery operation) / > 18 V (mains operation)

Qualities

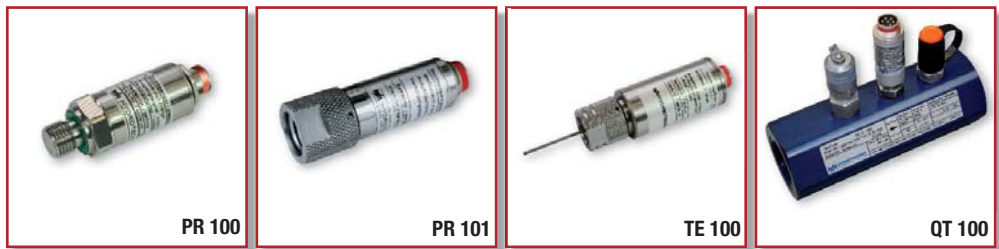|	
Casing	Aluminium, RAL 3004
Dimensions	~ 160 x 80 x 40 mm (L x W x H)
Weight	~ 661 g
Protection type	IP 40
Temperature – operation	0 ... 50 °C @ 0 ... 80 % r.h. (not condensing)
– storage	-20 ... +50 °C

MultiHandy 3020 / 3025 Order data

Single unit

Range of delivery	Order Nº

MultiHandy 3020, standard keypad
MultiHandy 3025, capacitive keypad
  • Power pack 24 VDC with country-specific adaptors
  • USB cable
  • Short operation instructions
  • Data CD with **HYDRO**com 6 Base
	3160-00-72.00
	3160-00-73.00

Measuring sets

PR 100   PR 101   TE 100   QT 100

Pressure measurement	Order Nº

Version A
  • All components of the single unit
  • **HYDRO**com 6, program version Full, 3 licenses
  • 2x HySense® PR 100 pressure sensor
  • 2x Minimess® direct connector 1620
  • 2x measuring cable standard, 5.0 m
  • Plastic case, black
	3020A-pp-xx[1]-xx[1]
	3025A-pp-xx[1]-xx[1]
	
	1: see below for measuring
	   range codes

Version B
  • All components of the single unit
  • **HYDRO**com 6, program version Full, 3 licenses
  • 2x HySense® PR 101 pressure sensor
  • 2x measuring cable standard, 5.0 m
  • Plastic case, black
	3020B-pp-xx[1]-xx[1]
	3025B-pp-xx[1]-xx[1]
	
	1: see below for measuring
	   range codes

Pressure and temperature measurement	Order No

Version A
  • All components of the single unit
  • **HYDRO**com 6, program version Full, 3 licenses
  • 1x HySense® PR 100 pressure sensor
  • 1x Minimess® direct connector 1620
  • 1x HySense® TE 100 temperature sensor
  • 2x measuring cable standard, 5.0 m
  • Plastic case, black
	3020A-pT-xx[1]
	3025A-pT-xx[1]
	
	1: see below for measuring
	   range codes

Version B
  • All components of the single unit
  • **HYDRO**com 6, program version Full, 3 licenses
  • 1x HySense® PR 101 pressure sensor
  • 1x HySense® TE 100 temperature sensor
  • 2x measuring cable standard, 5.0 m
  • Plastic case, black
	3020B-pT-xx[1]
	3025B-pT-xx[1]
	
	1: see below for measuring
	   range codes

MultiHandy 3020 / 3025 Order data and Accessories

Measuring sets

Pressure, temperature and volume flow rate measurement	Order No
Version A	
• All components of the single unit	3020A-pTQ-xx[1]-yy[2]
• **HYDRO**com 6, program version Full, 3 licenses	3025A-pTQ-xx[1]-yy[2]
• 1x HySense® PR 100 pressure sensor	
• 1x Minimess® direct connector 1620	
• 1x HySense® TE 100 temperature sensor	
• 1x HySense® volume flow rate sensor	1: see below for measuring range codes
• 3x measuring cable standard, 5.0 m	2: see below for measuring range codes
• Plastic case, black	
Version B	
• All components of the single unit	3020B-pTQ-xx[1]-yy[2]
• **HYDRO**com 6, program version Full, 3 licenses	3025B-pTQ-xx[1]-yy[2]
• 1x HySense® PR 101 pressure sensor	
• 1x HySense® TE 100 temperature sensor	
• 1x HySense® volume flow rate sensor	1: see below for measuring range codes
• 3x measuring cable standard, 5.0 m	2: see below for measuring range codes
• Plastic case, black	

Meas. ranges PR 100 / PR 101	Code	Measuring ranges QT 100	Code
0 ... 600 bar | 0 ... 8,700 psi	18	16 ... 600 l/min | 4.25 ... 158.5 gpm	72
0 ... 400 bar | 0 ... 5,800 psi	15	9 ... 300 l/min | 2.35 ... 79.25 gpm	71
0 ... 200 bar | 0 ... 2,900 psi	10	2 ... 75 l/min | 0.5 ... 19.8 gpm	70
0 ... 60 bar | 0 ... 870 psi	21	1 ... 10 l/min | 0.26 ... 2.6 gpm	01
-1 ... +6 bar | -14 ... +87 psi	32		

Accessories

Measuring cables are contained in the chapter „Accessories"

Power pack (plug version), 110/240 VAC, 50/60 Hz – 24 VDC/630 mA	8812-20-02.00
Power pack (table version), 100/240 VAC, 50/60 Hz – 24 VDC/630 mA	8812-02-01.00
Car connection cable, 12 VDC – 24 VDC, 5.0 m	8824-64-05.00
Batteries, NiMH, 14.4 V, 1,100 mAh	8873-08-02.00
USB cable, USB-A – USB-B, USB 2.0, 2.0 m	8824-F4-02.00
Nylon bag, black	8875-01-02.00
Transportation case, black, with turbine compartment	3160-00-62.06
Data CD, software and operation instructions manual	8874-16-00.01
Upgrade **HYDRO**com 6, Full to Professional, 3 licenses	8874-19-01.01
Calibration, single channels or as measuring chain with sensors (option)	3199-12-00.11
Service package Basic	3199-30-00.01
Service package Plus	3199-30-01.02
Service package Professional	3199-30-02.02

MultiHandy 2020

This measuring device is captivating by its easy user friendly operation. Each measuring set has everything needed for immediate plug and play measurements. Connect sensors – switch device on – read measured values.

✓ **Fast & easy to measuring success:**
plug – switch on – measure

✓ **Less errors:**
no programming required due to automatic sensor detection

✓ **PC connection included:**
data transfer via USB, evaluation software free of charge

✓ **Large internal memory:**
for more than 160 hours of data recording

✓ **Powerful batteries:**
measure the whole day without re-charging

✓ **Various functions:**
even for demanding measuring tasks

MultiHandy 2020 Technical data

Inputs and channels

Analog input channels	**2x** (for sensors with or without Hydrotechnik ISDS)
Signals	**0/4 ... 20 mA** (sensors without ISDS only 0 ... 20 mA)
A/D converter	12 bit
Measuring rate	1,000 values per second
Error limits	± 0.2 % of measured value
Electrical meas. connector	6 pole jack, compatible to DIN 45 322, IEC 60130-9
Special channels	1x
Calculations	difference

MultiHandy 2020 Technical data

Data memory

Type	Flash 128 kB
Measuring series	1
Values per series	max. 60,000
Recording rate	1 ms / 10 ms / 100 ms / 1 s / 10 s (settable)
Recording time	30 s ... ~ 166 h

Equipment

Display	2.5" LCD, illuminated
Software filter	switchable
Interface	USB 2.0 UART (virtual COM interface)
Power supply – mains	Power pack (plug version) 6 VDC / 850 mA
– batteries	NiMH / 2x AA / 2.4 V / 2,500 mAh
– battery performance	max. 10 h
– sensors	12 V / 100 mA

Qualities

Casing	ABS plastic, RAL 3004
Dimensions	~ 185 x 90 x 46 mm (L x W x H)
Weight	~ 292 g
Protection type	IP 40
Temperature – operation	0 ... 60 °C @ 0 ... 80 % r.h. (not condensing)
– storage	-20 ... +70 °C
Stability	tested acc. to IEC 60068

MultiHandy 2020 Order data

Single unit

Range of delivery	Order №
• Measuring device • Power pack 6 VDC with country-specific adaptors • USB cable • Short operating instructions manual • **HYDRO**com 6 Base as download free of charge	3160-00-69.00

MultiHandy 2020 Order data and accessories

Measuring set

Pressure measurement	Order Nº

• All components of the single unit
• 2x HySense® PR 109 pressure sensor
  with attached measuring cable, 2.5 m,
• 2x Minimess® direct connector 1620
• Plastic case, red
	2020D-pp-xx[1]-xx[1]
	
	1: see below for measuring
	    range codes

| Available pressure sensors for measuring set MultiHandy 2020			Code
• 0 ... 600 bar	0 ... 8,700 psi	0 ... 60 MPa	18
• 0 ... 400 bar	0 ... 5,800 psi	0 ... 40 MPa	15
• 0 ... 200 bar	0 ... 2,900 psi	0 ... 20 MPa	10
• 0 ... 60 bar	0 ... 870 psi	0 ... 6 MPa	21
• -1 ... +6 bar	-14 ... +87 psi	-0.1 ... +0.6 MPa	32

Accessories

Measuring cables are contained in the chapter „Accessories"

Compatible sensors (further sensors on request)	Order Nº
• Temperature sensor HySense® TE 100, -50 ... +200 °C, 0 ... 20 mA, ISDS	3973-04-S-01.00S
• Temperature – surface / immersion sensor HySense® TE 200, -50 ... +200 °C, 4 ... 20 mA, ISDS	3170-01-S-03.00 3170-01-S-06.00
• Rotational speed sensor HySense® RS 110, 4 ... 20 mA, ISDS	3130-06-S-01.00

• Volume flow rate – turbine
  HySense® QT 110, e.g. 9 ... 300 l/min, 0 ... 20 mA, ISDS
  calibrated for mineral oil with 30 cSt
	31G7-71-S-35.030

• Volume flow rate – turbine
  HySense® QT 210, e.g. 9 ... 300 l/min, 0 ... 20 mA, ISDS
  calibrated for watery media
	33G7-78-S-35.V012G

Car connection cable, 12 ... 24 V DC – 6.0 V DC, 4.0 m	8812-09-04.00
Power pack (plug version), 230 V AC – 6.0 V DC	8812-00-00.33
USB cord, 2.0 m	8824-F4-02.00
Upgrade **HYDRO**com 6, Base to Full, 3 licenses	8874-19-01.02
Upgrade **HYDRO**com 6, Base to Professional, 3 licenses	8874-19-01.01
Calibration, single channels or as measuring chain with sensors (option)	3199-12-00.11
Service package Basic	3199-30-00.01
Service package Plus	3199-30-01.01
Service package Professional	3199-30-02.01

Stationary Measuring Instruments

Whether as panel mounted device, pressure switch or rack-mount measuring system: you always have the suited solution for test and control rooms, controls and systems for the supervision of plant and systems.
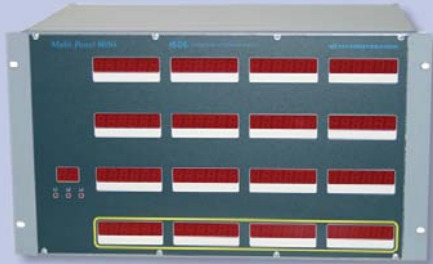
MultiPanel 8050

Rack-mounted high end measuring system with 8 or 16 displays; more information on page 8

SEG 1060

1-channel measuring device to install in panels, either with analog or digital output or display only

MultiEPC

Electronic pressure switch with two switching outputs, also available in a DESINA conforming version

SEG 1060

This panel-mounted device is perfectly tuned to the Hydrotechnik sensors. It's compact design can be integrated without problems, operated easily with four front panel buttons.

✓ **Measuring instrument for panel installation:**
with switchable input for analog and frequency sensors

✓ **High usability:**
comfortable reading of the large display

✓ **Large flexibility:**
by optional outputs

✓ **Easy operation:**
with four keys and logical menu structure

Measuring channels

Number	1x (switchable for analog and frequency sensors)
Analog signals	0/4 ... 20 mA, 0 ... 10 V
Analog measuring rate	100 Hz
A/D converter	12 bit
Frequency signals	0 Hz ... 10 kHz
Frequency meas. range	100 Hz (for f ≥ 100 Hz), 1/f + 15 ms (for f < 100 Hz)
Error limits	± 0.2 % FS + 1 digit

SEG 1060 Technical data

Outputs (option)

Digital output	1x
Signal	Relais output (opener / closer)
max. load	250 VAC / 10 A
Reaction time	≤ 25 ms (standard signal), ≤ 0.5 Sek. (frequency > 4 Hz)
Analog output	1x
Signals	0/4 ... 20 mA
D/A converter	12 bit
Refresh rate	100 Hz or measuring rate
Error limits	± 0.3 % FS

SEG 1060 Technical and order data

Qualities

Electrical meas. connectors	clamp strip
Power supply	230 VAC (type 1), 24 VDC (type 2)
Sensor power supply	24 VDC / 22 mA (type 1), 18 VDC / 35 mA (type 2), separated galvanically
Casing	ABS plastic, 115 x 48 x 96 mm (L x W x H)
Front frame	96 x 48 mm (W x H)
Weight	151 g (type 1), 182 g (type 2)
Protection type	IP 54 (mounted), IP 65 (on request)
Temperature range	-20 ... +50 °C (operation), -30 ... +70 °C (storage)
Relative humidity	0 ... 80 % r.h. (not condensing)

Order data

Range of delivery	Order Nº
SEG 1060, 24 V DC	3192-04-10.00
SEG 1060, 24 V DC, digital- and analog output	3192-04-11.00
SEG 1060, 230 V AC	3192-04-20.00
SEG 1060, 230 V AC, digital- and analog output	3192-04-21.00
• Measuring device • Operating instructions manual • Mounting set	

Accessories

Sensor cable, jack M16 x 0.75, 5 pole – open cable ends, 2.5 m	8824-C1-02.50Z
Sensor cable, jack M16 x 0.75, 5 pole – open cable ends, 5.0 m	8824-C1-05.00Z
Sensor cable, jack M16 x 0.75, 5 pole – open cable ends, 10.0 m	8824-C1-10.00Z

MultiEPC

This electronic pressure switch is available in standard and DESINA conforming versions with rotatable casing and digital pressure display. Either with one or two independant, programmable limit switches, and one analog output to monitor the pressure curve.

✓ **Electronic pressure switch:**
with two switching outputs

✓ **Universal use:**
five pressure measuring ranges up to 700 bar

✓ **Measured data downloadable:**
output signal 0/4 ... 20 mA

✓ **Easy operation:**
with three keys and logical menu structure

Technical data

Meas. principle / pressure type	piezo-resistive / relative pressure
Output signal	0/4 ... 20 mA (DESINA: 4 ... 20 mA)
Measuring connector	M12 x 1, 5 pole (electrical) / ISO 228 – G ¼″ (mechanical)
Error limits	± 0.5 % v. EW
Response time	≥ 10 ms

Outputs

Switching outputs	2 MOSFET high side switch PNP (closer / opener)
Switching voltage	Ub – 1.5 V DC
Switching / short voltage	max. 0.7 A (pre switch) / 2,4 A (per switch)

Qualities

Supply voltage	15 ... 30 VDC (nominal 24 VDC)
Current consumption	< 100 mA
Materials	GD-ZnAl4Cu1 (casing) / 1.4542 (membrane)
Temperature range	-20 ... +85 °C (operation, medium) / -30 ... +100 °C (storage)
Orientation	arbitrary

Order data

Measuring range (bar)	Measuring range (psi)	Standard	DESINA
0 ... 25	0 ... 360	3160-10-40.01	3160-11-40.02
0 ... 100	0 ... 1,450	3160-10-16.01	3160-11-16.02
0 ... 250	0 ... 3,625	3160-10-17.01	3160-11-17.02
0 ... 400	0 ... 5,800	3160-10-15.01	3160-11-15.02
0 ... 700	0 ... 10,150	3160-10-39.01	3160-11-39.02

Accessories

Cable, M12 x 1 straight, 5 pole – open cable ends, 5.0 m*	8824-L0-05.00
Cable, M12 x 1 90°, 5 pole – open cable ends, 5.0 m*	8824-L1-05.00

*: 2.5 m and 10.0 m on request

MultiXtend Extension Modules

MultiXtend is the name of the handy modules that can be used to expand the Hydrotechnik measuring instruments or equip them with additional functions. They may provide further input channels for sensors with analog or frequency output signal, allow the measuring of electrical measurands, or the connection of thermocouples.

More channels ...

MultiXtend A
MultiXtend f
MultiXtend Thermo

More signals ...

MultiXtend Thermo
MultiXtend UI
MultiXtend NPN

More functions ...

MultiXtend Split
MultiXtend Trigger

MultiXtend

Extension Modules

... make more of your measuring instruments

Compatibility

		CAN output signal	MultiSystem 8050	MultiSystem 5060 *Plus*	MultiSystem 4010	MultiBox 306x	MultiHandy 302x	MultiHandy 2020
			Usable with ...					
MultiXtend A	4 analog input channels	✓	✓	✓	✓	✗	✗	✗
MultiXtend f	4 frequency input channels	✓	✓	✓	✓	✗	✗	✗
MultiXtend f	1 frequency input channel	✓	✓	✓	✓	✗	✗	✗
MultiXtend Thermo	connect 4 thermocouples	✓	✓	✓	✓	✗	✗	✗
MultiXtend Thermo	connect 1 thermocouple	✗	✓	✓	✓	✓	✓	✗
MultiXtend UI	measure current and voltage	✗	✓	✓	✓	✓	✓	✗
MultiXtend Split	2 recipients for 1 sensor	✗	✓	✓	✓	✓	✓	✓
MultiXtend NPN	connect 1 NPN frequency sensor	✗	✓	✓	✓	✓	✓	✗
MultiXtend Trigger	synchronise up to 4 instruments	✗	✓	✓	✓	✗	✗	✗
MultiMeter	measure electrical measurands	✗	✓	✓	✓	✗	✗	✗

MultiXtend UI

Measures current or voltage giving an analog output (0 ... 20 mA). The measuring inputs are separated galvanically, a PWM filter can be enabled. Choose one of the two device versions with different measuring ranges.

Measuring range voltage	± 60 V DC	± 30 V DC
Input resistor	60 kΩ	10 MΩ
Measuring range current	± 4 A DC	± 2 A DC
Input resistor	0.05 Ω	0.1 Ω
Supply voltage	13 ... 30 V DC	
Supply current	40 mA (without signal)	
Measuring error	< ± 1 % of end value	
Zero value	at output signal 10 mA	

MultiXtend UI • measuring ranges ± 30 V DC / ± 2 A DC	316A-00-00.20
MultiXtend UI • measuring ranges ± 60 V DC / ± 4 A DC	316A-00-00.30
Connection cable for measuring instruments, 5.0 m (measuring cable MKS 03)	8824-S1-05.00S
Replacement fuse 2 A (for 316A-00-00.20)	8829-01-00.13
Replacement fuse 4 A (for 316A-00-00.30)	8829-01-00.17

MultiXtend

Extension Modules

MultiXtend A

Fig. 1

MultiXtend f

Fig. 1 / 2

MultiXtend Thermo

without picture

Fig. 1

Fig. 2

Use these modules to connect additional analog or frequency sensors, or thermocouples. The sensor signals are digitised and transmitted via CAN bus to the measuring instrument.

The MultiXtend A provides four inputs for analog sensors with 0 ... 20 mA or 4 ... 20 mA signal. You may connect up to four frequency sensors to the MultiXtend f, the MultiXtend Thermo is available for four thermocouples of the types Pt 100, J or K.

Technical data

	MultiXtend A	MultiXtend Thermo	MultiXtend f
Input signal	0/4 ... 20 mA	Pt 100 / J / K	0 ... 500 kHz
A/D converter	16 bit	16 bit	–
Scan rate	200 Hz	100 Hz	1,000 ms *
Error limits	0.01 % v. EW	0.01 K	± 1 Hz *
Operation / storage temperature	-40 ... +85 °C / -50 ... +140 °C		
Protection type	IP 65 (all cables screwed)		
Casing	Aluminium die casting		
Dimensions	125 x 57 x 80 mm (L x W x H)		

* Gate time measurement: measuring accuracy depends on set gate time; at gate time 1,000 ms (default) the measuring accuracy is ± 1 Hz, at gate time 100 ms it is ± 10 Hz

Order data

MultiXtend A • 4x input signal 0 ... 20 mA (with jacks)	3160-00-00.72A0B
MultiXtend A • 4x input signal 0 ... 20 mA (with cable screwings)	3160-00-00.72A0
MultiXtend A • 4x input signal 4 ... 20 mA (with jacks)	3160-00-00.72A4B
MultiXtend A • 4x input signal 4 ... 20 mA (with cable screwings)	3160-00-00.72A4
MultiXtend f • 4x input signal frequency	3160-00-00.77
MultiXtend Thermo • 4x thermocouple type J (with cable screwings)	3160-00-00.73J
MultiXtend Thermo • 4x thermocouple type J, jack „Mini"	3160-00-00.73JB
MultiXtend Thermo • 4x thermocouple type K (with cable screwings)	3160-00-00.73K
MultiXtend Thermo • 4x thermocouple type K, jack „Mini"	3160-00-00.73KB
MultiXtend Thermo • 4x thermocouple type Pt 100	3160-00-00.73PT

Accessories

CAN connection cable for MultiSystem 8050, 5.0 m	8824-N1-05.00
CAN connection cable for MultiSystem 5060, 5.0 m	8824-M5-05.00
CAN connection cable for MultiSystem 5060 Plus and 4010, 5.0 m	8824-R7-05.00
CAN power supply, power pack in table version	8812-00-00.34
CAN Y distributor, M12 x 1	8808-50-01.01

MultiXtend   Extension Modules

MultiXtend Split

Galvanically separated signal splitter for analog sensors. You may e.g. connect a mounted pressure sensor to a machine display and also connect to a hand held measuring device at the same time.

Input signal	0/4 ... 20 mA
Supply voltage	12 ... 30 V DC
Current consumption at OUT 2	30 mA (without signal)
Linearity error	± 0.3 % FS (at 23 °C, loop resistor 10 Ω)
Warm-up time	5 min.
Operation / storage temperature	-20 ... +85 °C / -40 ... +125 °C
Dimensions	120 x 84 x 44.5 mm (L x W x H)

MultiXtend Split	316A-00-00.40
Connection cable for measuring instruments, 5.0 m (measuring cable MKS 03)	8824-S1-05.00S

MultiXtend Trigger

Box to distribute a trigger signal to up to four measuring systems. This allows to run synchronised recordings on up to 96 channels that can be combined later on a PC using **HYDRO**com.

Input signal	Hydrotechnik-specific trigger signal
Supply voltage	not required
Protection type	IP 40
Operation / storage temperature	-40 ... +85 °C
Dimensions	120 x 75 x 44.5 mm (L x W x H)

MultiXtend Trigger	316A-00-00.50
Trigger cable for connection to measuring systems, 0.5 m	8824-F2-00.50

MultiXtend   Extension Modules

MultiXtend Thermo

Box to connect a thermocouple of the types J or K to an analog input of your measuring instrument.

Input signal	thermocouple type J or K
Supply voltage	7 ... 30 V DC
Current consumption	20 mA (without signal)
Linearity error	± 0.1 % FS (at 23 °C, loop resistor 10 Ω)
Operation / storage temperature	-40 ... +85 °C
Dimensions	120 x 82 x 44.5 mm (L x W x H)

MultiXtend Thermo, type J	316A-00-00.70
MultiXtend Thermo, type K	316A-00-00.75
Connection cable for measuring instruments, 5.0 m (measuring cable MK 01)	8824-S1-05.00S

MultiXtend f

Box to connect a frequency sensor to a measuring instrument. The sensor signal is digitised and transmitted via CAN bus. May also be used to feed the signal into a standard CAN bus.

Input signal	10 Hz ... 4 kHz
Scan rate	50 Hz
Error limits	± 0.1 % of final value
Operation / storage temperature	-40 ... +85 °C
Dimensions	120 x 82 x 44.5 mm (L x W x H)

MultiXtend f	316A-00-00.60
CAN connection cable for MultiSystem 8050, 5.0 m	8824-N1-05.00
CAN connection cable for MultiSystem 5060 Plus and 4010, 5.0 m	8824-R7-05.00
CAN power supply, power pack in table version	8812-00-00.34
CAN Y distributor, M12 x 1	8808-50-01.01
CAN terminal resistor 120 Ω	8872-02-01.01

MultiXtend

Extension modules

MultiXtend NPN

Converts the NPN output signal of a frequency sensor into a PNP signal that can be fed into Hydrotechnik measuring instruments.

Input signal	NPN frequency signal
Supply voltage	14 ... 30 V DC
Current consumption	6 mA (without sensor)
NPN feed voltage / current	10 ... 12 VDC / 2 ... 50 mA
Operation / storage temperature	-20 ... +85 °C / -30 ... +90 °C
Dimensions	120 x 82 x 44.5 mm (L x W x H)

MultiXtend NPN	316A-00-00.80
Connection cable to measuring instruments, 5.0 m (measuring cable MK 01)	8824-S1-05.00S

MultiMeter

✓ Measure electrical measurands
✓ Data transfer to RS 232 interface
✓ Only suited for MultiSystem 5060 Plus and MultiSystem 4010
✓ Technical data on request

MultiMeter Voltcraft, type VC 920 (with connection cable to MultiSystem)	8877-00-04.10
MultiMeter Voltcraft, type VC 940 (with power measurement and connection cable to MultiSystem)	8877-00-05.10
MultiMeter Voltcraft, type VC 960 (with enlarged memory and connection cable to MultiSystem)	8877-00-06.10

MultiXtend   Mounting Systems

The cap rail system is ideal to mount MultiXtend extension modules on the instruments MultiSystem 5060 Plus and MultiSystem 4010. Also suited for DIN rail installation.

✓ Fix cap rail and clip

✓ Mount MultiXtend at the rearside of the measuring instrument ...

✓ ... or install it in a switchboard cabinet

Mounting set: cap rail, clip, screws	8854-00-00.02
Velcro tape mounting set: 5 pieces	8840-00-00.13

Use our velcro tape mounting set for fast and firm installation of MultiXtend on measuring systems or other objects.

HySense® Sensors

Pressure sensors

PR

PR 100	PR 101	PR 400	PR 109
Robust sensor, especially for mobile use; million-fold proven	Version with direct Minimess® connector for a quicker coupling	Fast sensor for demanding measuring tasks (up to 10 kHz)	Sensor with measuring cable for the MultiHandy 2020

Used in	Measuring Set A	Measuring Set B	Measuring Set C	Measuring Set D

Temperature sensors

TE **TP**

TE 100	TE 200	TP 180
Robust sensor, especially for mobile use	Hand sensor with different measuring tips	Combined sensor for pressure + temperature

Used in	Meas. Set A / B / C

Volume flow rate sensors

QT **QG**

QT 1xx	QT 2xx	QG 1xx
Proven measuring turbine for mineral oils, bi-directional measuring possible	Proven measuring turbine for watery media, bi-directional measuring possible	Gear flow meter for a broad viscosity range

Used in	Meas. Set A / B / C

Further sensors

QL **QO** **RS**

QL	QO	RS	
Load valves to determine the characteristic curves of pumps	Oval wheel counter for small volume flow rates	Rotational speed sensors	More sensors are contained in our sensor catalog

HySense® PR 100 • PR 101

Robust and million-fold proven sensor, especially for mobile use. With short response time and available for many pressure ranges. PR 101 with attached direct connector.

Technical data

	PR 100	PR 101
Meas. principle / pressure type	piezo-resistive / relative pressure	
Output signal	0 ... 20 mA	
Electrical measuring connector	M16 x 0.75, 6 pole (plug)	
Mechanical measuring connector	ISO 228 – G ¼˝	Minimess® direct connector 1620
Protection type	IP 67 (with screwed plug)	
Materials	High-grade steel (casing and membrane)	
Dimensions (L x W)	67 x 22 mm	81 x 25 mm
Weight	~ 85 g	~ 110 g

Operating limits

Over-load / burst pressure	1.5-times nominal pressure / 3-times nominal pressure
Supply voltage	10 ... 30 VDC
Current consumption	6.5 mA
Response time	≤ 1 ms (10 ... 90 %)
Error limites	≤ ± 0,2 % (linearised)
Temperature ranges	-40 ... +100 °C (operation) / -40 ... +130 °C (medium, storage)

Order data PR 100

Measuring range (bar)	Measuring range (psi)	Order Nº
-1 ... +6 bar	-14 ... +87	3403-32-S-E5.33
0 ... 60	0 ... 870	3403-21-S-E5.33
0 ... 200	0 ... 2,900	3403-10-S-E5.33
0 ... 400	0 ... 5,800	3403-15-S-E5.33
0 ... 600	0 ... 8,700	3403-18-S-E5.33

Order data PR 101

Measuring range (bar)	Measuring range (psi)	Order Nº
-1 ... +6 bar	-14 ... +87	34W3-32-S-E5.33
0 ... 60	0 ... 870	34W3-21-S-E5.33
0 ... 250	0 ... 3.625	34W3-17-S-E5.33
0 ... 400	0 ... 5.800	34W3-15-S-E5.33
0 ... 600	0 ... 8.700	34W3-18-S-E5.33

Accessories PR 100

Minimess® direct connector straight, ISO 228 – G ¼˝ int., screw series 1620	2103-07-18.62N
Minimess® direct connector 90°, ISO 228 – G ¼˝ int., screw series 1620	2146-13-05.00N
Minimess® direct connector straight, ISO 228 – G ¼˝ int., screw series 1215	2101-07-18.62N
Minimess® direct connector 90°, ISO 228 – G ¼˝ int., screw series 1215	2146-04-02.00N

HySense® PR 109

Adapted version of the PR 100 for the unique use with the measuring device MultiHandy 2020. With ISDS and attached measuring cable for easiest operation.

PR

Technical data

	PR 109
Meas. principle / pressure type	Piezo-resistive / relative pressure
Output signal	4 ... 20 mA
Electrical measuring connector	M16 x 0.75, 6 pole (plug), at measuring cable 5.0 m
Mechanical measuring connector	ISO 228 – G ¼″
Protection type	IP 67 (with screwed plug)
Materials	high-grade steel (casing and membrane)
Dimensions (L x W)	59 x 22 mm (without cable)
Weight	~ 85 g

Operating limits

Overload / burst pressure	1.5-times nominal pressure / 3-times nominal pressure
Supply voltage	10 ... 30 VDC
Current consumption	6.5 mA
Response time	≤ 1 ms (10 ... 90 %)
Error limits	≤ ± 0.2 % (linearised)
Temperature ranges	-40 ... +100 °C (operation) / -40 ... +130 °C (medium, storage)

Order data

Measuring range (bar)	Measuring range (psi)	Order Nº
-1 ... +6 bar	-14 ... +87	3403-32-S-N4.37
0 ... 60	0 ... 870	3403-21-S-N4.37
0 ... 200	0 ... 2,900	3403-10-S-N4.37
0 ... 400	0 ... 5,800	3403-15-S-N4.37
0 ... 600	0 ... 8,700	3403-18-S-N4.37

Accessories

Minimess® direct connector straight, ISO 228 – G ¼″ int., screw series 1620	2103-07-18.62N
Minimess® direct connector 90°, ISO 228 – G ¼″ int., screw series 1620	2146-13-05.00N
Minimess® direct connector straight, ISO 228 – G ¼″ int., screw series 1215	2101-07-18.62N
Minimess® direct connector 90°, ISO 228 – G ¼″ int., screw series 1215	2146-04-02.00N

HySense® PR 300

Fast, highly precise pressure sensor to measure pressure peaks. Characterised by good noise qualities and very short warm-up time.

Technical data

	PR 300
Meas. principle / pressure type	piezo-resistive / relative pressure
Output signal	0 ... 20 mA
Electrical measuring connector	M16 x 0.75, 6 pole (plug)
Mechanical measuring connector	ISO 228 – G ¼˝ internal thread
Protection type	IP 40 (with screwed plug)
Materials	1.4104, 1.4301 (casing) / 1.4435 (membrane)
Dimensions (L x W x H)	30 x 30 x 100 mm
Weight	~ 120 g

Operating limits

Overload / burst pressure	1.5-times nominal pressure / 2.5-times nominal pressure
Supply voltage	6,5 ... 30 VDC
Current consumption	< 10 mA
Response time	1 ms (0 ... 98 %)
Error limits	≤ ± 0,2 % (linearised)
Temperature ranges	-20 ... +80 °C (operation, medium) / -20 ... +85 °C (storage)

Order data

Measuring range (bar)	Measuring range (psi)	Order Nº
-1 ... 6	-14 ... +87	3403-32-S-71.33A

Accessories

Minimess® direct connector straight, ISO 228 – G ¼˝ ext., screw series 1620	2103-07-41.62N
Minimess® direct connector 90°, ISO 228 – G ¼˝ ext., screw series 1620	2146-54-09.40N
Minimess® direct connector straight, ISO 228 – G ¼˝ ext., screw series 1215	2101-07-41.62N
Minimess® direct connector 90°, ISO 228 – G ¼˝ ext., screw series 1215	2146-54-19.20N

HySense® PR 400

Fast pressure sensor for demanding measuring tasks with color codes to avoid mixing up. Used in the measuring sets version C.

PR

Technical data

	PR 400
Meas. princile / pressure type	piezo-resistive / relative pressure
Output signal	4 ... 20 mA
Electrical measuring connector	M16 x 0.75, 6 pole (plug)
Mechanical measuring connector	ISO 228 – G ¼˝
Protection type	IP 65 (with screwed plug)
Materials	1.4104, 1.4301 (casing) / 1.4435 (membrane)
Dimensions (L x W)	98 x 22 mm
Weight	~ 120 g

Operating limits

Overload / burst pressure	1.5-times nominal pressure / 2.5-times nominal pressure
Supply voltage	6,5 ... 30 VDC
Current consumption	< 4 mA
Response time	none
Error limits	≤ ± 0,2 % (linearised)
Temperature ranges	-20 ... +80 °C (operation, medium) / -20 ... +85 °C (storage)

Order data

	Measuring range (bar)	Measuring range (psi)	Order Nº
▮	0 ... 60	0 ... 870	34P3-21-S-01.37A2
▮	0 ... 200	0 ... 2,900	34P3-10-S-01.37A2
▮	0 ... 400	0 ... 5,800	34P3-15-S-01.37A2
▮	0 ... 600	0 ... 8,700	34P3-18-S-01.37A2

Accessories

Minimess® direct connector straight, ISO 228 – G ¼˝ int., screw series 1620	2103-07-18.62N
Minimess® direct connector 90°, ISO 228 – G ¼˝ int., screw series 1620	2146-13-05.00N
Minimess® direct connector straight, ISO 228 – G ¼˝ int., screw series 1215	2101-07-18.62N
Minimess® direct connector 90°, ISO 228 – G ¼˝ int., screw series 1215	2146-04-02.00N

Color codes

| 0 ... 60 bar | 0 ... 200 bar | 0 ... 400 bar | 0 ... 600 bar |

Definite assignment of strong colors to the different pressure ranges. A mixing up and potential destruction of the sensor are avoided.

HySense® TE 100

Reliable sensor that measures directly in the medium. With attached direct connector it can be screwed on a Minimess® p/T measuring point. With ISDS ideal for mobile use.

Technical data

Measuring principle	Pt 100 (platinum measuring resistor acc. to DIN 43760, class B)
Output signal	0 ... 20 mA
Electrical measuring connector	M16 x 0.75, 6 pole (plug)
Mechanical measuring connector	Minimess® 1620 p/T
Protection type	IP 64 (with screwed plug)
Materials	1.4104 (casing)
Dimensions (L x W)	132.5 x 30 mm
Weight	~ 230 g

Operating limits

Supply voltage	10 ... 30 VDC
Error limits	≤ ± 1.0 %
Temperature ranges	-20 ... +80 °C (operation) / -20 ... +85 °C (storage)
Medium temperature	-50 ... +200 °C

Order data & accessories

HySense® TE 100, measuring range -50 ... +200 °C, ISDS	3973-04-S-01.00S
Minimess® 1620 p/T measuring point, ISO 228 – G ¼″, sealing NBR	2149-04-15.13N
Minimess® 1620 p/T measuring point, ISO 228 – G ¼″, sealing FKM	2149-04-15.53N
Minimess® 1620 p/T measuring point, M10 x 1, sealing NBR	2149-04-19.13N
Minimess® 1620 p/T measuring point, M10 x 1, sealing FKM	2149-04-19.53N

HySense® TE 200

Hand sensor to measure the temperature of fluids or surfaces. With ISDS ideal for mobile use.

Technical data

Measuring principle	Pt 100 (platinum measuring resistor acc. to DIN 43760, class B)
Output signal	4 ... 20 mA
Electrical measuring connector	M16 x 0.75, 6 pole (plug) at helix cable (1.2 m)
Mechanical measuring connector	sensor tip or plate
Protection type	IP 40
Materials	1.451 (sensor tip, 150 mm))
Weight	~ 207 g

Operating limits

Supply voltage	12 ... 30 VDC (current consumption 4 mA)
Error limits	≤ ± 1.0 % (of final value)
Temperature ranges	-20 ... +85 °C (operation, storage)
Medium temperature	corr. to measuring range

Order data

	Sensor plate, measuring range -50 ... +200 °C	3170-01-S-03.00
	Sensor plate, measuring range -50 ... +400 °C	3170-01-S-07.00
	Sensor tip, measuring range -50 ... +200 °C	3170-02-S-06.00
	Sensor tip, measuring range -50 ... +400 °C	3170-02-S-08.00

HySense® TP 180

Dual sensor for the simultaneous measuring of pressure and temperature at one Minimess® p/T measuring point. Measures directly in the medium that makes the sensor very accurate.

Technical data

	Pressure sensor	Temperature sensor
Measuring principle	piezo-resistive (relative pressure)	Pt 100 (platinum measuring resistor acc. to DIN 43760, class B)
Output signal	4 ... 20 mA	
Electrical measuring connector	M16 x 0.75, 8 pole (plug)	
Mechanical measuring connector	Minimess® 1620 p/T	
Protection type	IP 40 (with screwed plug)	
Materials	1.4104 (casing) / 1.4435 (membrane)	
Dimensions (L x W)	182 x 28 mm	
Weight	~ 255 g	

Operating limits

	Pressure sensor	Temperature sensor
Overload / burst pressure	1.5-times / 2.5-times nominal pressure	
Supply voltage	10 ... 30 VDC (current consumption 4 mA)	
Response time	≥ 1 ms	
Error limits	± 0.5 % (of final value)	± 1.0 % (of final value)
Temperature ranges	-20 ... +80 °C (operation) / -20 ... +85 °C (storage)	
Medium temperature	-50 ... +200 °C	

Order data & Accessories

HySense® TP 180, measuring rangee 0 ... 60 bar bzw. -50 ... +200 °C	3763-04-34.00
HySense® TP 180, measuring rangee 0 ... 600 bar bzw. -50 ... +200 °C	3763-03-34.00
Measuring cable (separator cable), 8pole jack to 2x 5pole plug, 2.5 m	8824-D6-02.50
Measuring cable (separator cable), 8pole jack to 2x 5pole plug, 5.0 m	8824-D6-05.00
Minimess® 1620 p/T measuring point, ISO 228 – G ¼˝, sealing NBR	2149-04-15.13N
Minimess® 1620 p/T measuring point, ISO 228 – G ¼˝, sealing FKM	2149-04-15.53N
Minimess® 1620 p/T measuring point, M10 x 1, sealing NBR	2149-04-19.13N
Minimess® 1620 p/T measuring point, M10 x 1, sealing FKM	2149-04-19.53N

HySense® QT 100

Thousand-fold proven measuring turbine, either with analog or frequency output signal. Bi-directional flow rate measurement is possible, standard calibration viscosity is 30 cSt (mineral oils).

Technical data

Measuring principle	flow (turbine)
Calibration viscosity	30 cSt
Output signal	frequency (QT 100) / 4 ... 20 mA (QT 110)
Electrical measuring connector	M16 x 0.75, 6 pole (plug)
Mechanical measuring connector	acc. to measuring range
Protection type	IP 67 (QT 100) / IP 54 (QT 110)
Materials	3.4365 (casing) / FKM (sealings)
Turbine wheel material	1.4122 (measuring range 1 ... 10 l/min) / 1.0718 (other measuring ranges)
Weight	acc. to measuring range (see order data)

Operating limits

Mounting orientation	arbitrary
Supply voltage	12 ... 24 VDC
Current consumption	12 ... 15 mA (QT 100) / 24 ... 31 mA (QT 110)
Response time	none (QT 100) / 250 ms (QT 110)
Error limits	acc. to version and measuring range (see order data)
Temperature ranges	-20 ... +85 °C (operation, storage) / ≤ 120 °C (medium)

Order data

Output signal	Measuring range	Viscosity range	Mechanical measuring connector	Max. working pressure		Error limits	Weight	Order Nº
	l/min	cSt		bar	PSI	linearised	g	
QT 100 frequency (square wave)	1.0 ... 10	1 ... 30	ISO 228-G¼″	420	6,000	± 0.5 % of MV	630	31V7-01-S-35.030
	2.0 ... 75	1 ... 100	ISO 228-G¾″	420	6,000		785	31V7-70-S-35.030
	9.0 ... 300	1 ... 100	ISO 228-G1″	420	6,000		1,125	31V7-71-S-35.030
	16 ... 600	1 ... 100	ISO 228-G1¼″	350	5,000		1,380	31V7-72-S-35.030
QT 110 analog (4 ... 20 mA)	1.0 ... 10	1 ... 30	ISO 228-G¼″	420	6,000	± 0.7 % of FV	740	31G7-01-S-35.030
	2.0 ... 75	1 ... 100	ISO 228-G¾″	420	6,000		895	31G7-70-S-35.030
	9.0 ... 300	1 ... 100	ISO 228-G1″	420	6,000		1,235	31G7-71-S-35.030
	16 ... 600	1 ... 100	ISO 228-G1¼″	350	5,000		1,490	31G7-72-S-35.030

HySense® QT 200

Thousand-fold proven measuring turbine, either with frequency or analog output signal. Bi-directional volume flow rate measurement possible, developed for water and watery media.

Technical data

Measuring principle	flow (turbine)
Calibration viscosity	2.5 cSt (with oil, 1 cSt on request)
Output signal	frequency (QT 200) / 4 ... 20 mA (QT 210)
Electrical measuring connector	M16 x 0.75, 6 pole (plug)
Mechanical measuring connector	acc. to measuring range (see order data)
Protection type	IP 67 (QT 200) / IP 54 (QT 210)
Materials	1.4305 (casing) / FKM (sealings)
Turbine wheel material	1.4122 (measuring range 1 ... 10 l/min) / 1.0718 (other measuring ranges)
Weight	acc. to measuring range (see order data)

Operating limits

Mounting orientation	arbitrary
Supply voltage	12 ... 24 VDC
Current consumption	12 ... 15 mA (QT 200) / 24 ... 31 mA (QT 210)
Response time	none (QT 200) / 250 ms (QT 210)
Error limits	acc. to version and measuring range (see order data)
Temperature ranges	-20 ... +85 °C (operation, storage) / ≤ 120 °C (medium)

Order data

Output signal	Measuring range	Viscosity range	Mechanical measuring connector	Max. working pressure		Error limits	Weight	Order Nº
	l/min	cSt		bar	PSI	linearised	g	
QT 200 frequency (square wave)	1.0 ... 10	1 ... 30	ISO 228-G¼″	420	6,000		690	33V7-01-S-35.V012
	5.0 ... 100	1 ... 10	ISO 228-G¾″	420	6,000	± 0.5 % of MV	1,930	33V7-77-S-35.V012G
	15 ... 300	1 ... 10	ISO 228-G1¼″	420	6,000		3,300	33V7-78-S-35.V012G
	25 ... 600	1 ... 30	ISO 228-G1½″	350	5,000		4,035	33V7-79-S-35.V012G
QT 210 analog (4 ... 20 mA)	1.0 ... 10	1 ... 30	ISO 228-G¼″	420	6,000		800	33G7-01-S-35.V012
	5.0 ... 100	1 ... 10	ISO 228-G¾″	420	6,000	± 0.7 % of FV	2,040	33G7-77-S-35.V012G
	15 ... 300	1 ... 10	ISO 228-G1¼″	420	6,000		3,410	33G7-78-S-35.V012G
	25 ... 600	1 ... 30	ISO 228-G1½″	350	5,000		4,145	33G7-79-S-35.V012G

HySense® QG 100

Positive displacement gear flow meter. Covers a broad viscosity range and is available with frequency or analog output signal.

Technical data

Measuring principle	replacement (GFM)
Viscosity range	5 ... 500 cSt (possible range) / 30 cSt (standard calibration)
Output signal	frequency (QG 100) / 4 ... 20 mA (QG 110)
Electrical measuring connector	M16 x 0.75, 6 pole (plug)
Mechanical measuring connector	acc. to measuring range (see order data)
Protection type	IP 67
Materials	1.4305, 0.7060 (casing) / FKM (sealings)
Gear wheel material	1.7131
Weight	acc. to measuring range (see order data)

Operating limits

Mounting orientation	arbitrary
Supply voltage	12 ... 24 VDC
Current consumption	15 mA (QG 100) / 24 ... 31 mA (QG 110)
Response time	none (QG 100) / 2.5 sec. (QG 110)
Error limits	acc. to version and measuring range (see order data)
Temperature ranges	-20 ... +80 °C (operation) / -20 ... +85 °C (storage) / -20 ... +120 °C (medium)

Order data

Output signal	Measuring range	Geometric gear volume	Mechanical measuring connector	Max. working pressure		Error limite	Weight	Order Nº
	l/min	cm³		bar	PSI	linearised	g	
QG 100 frequency (square wave)	0.005 ... 1.0	~ 0.021	ISO 228-G¼″	420	6,000	± 0.5 % of MV	1,600	3143-01-S-35.030
	0.05 ... 5.0	~ 0.191	ISO 228-G¼″	630	9,000	± 0.5 % of MV	3,000	3143-02-S-35.030
	0.2 ... 30	~ 0.609	ISO 228-G³/₈″	630	9,000	± 0.5 % of MV	4,075	3143-03-S-35.030
	0.7 ... 70	~ 2.222	ISO 228-G¾″	420	6,000	± 0.4 % of MV	9,000	3143-04-S-35.030
	3.0 ... 300	~ 8.750	SAE flange 1¼″	420	6,000	± 0.5 % of MV	32,330	3143-05-S-35.030
QG 110 analog (4 ... 20 mA, with f/I converter)	0.005 ... 1.0	~ 0.021	ISO 228-G¼″	420	6,000	± 0.5 % of FV	1,600	3185-01-S-35.030
	0.05 ... 5.0	~ 0.191	ISO 228-G¼″	630	9,000	± 0.7 % of FV	3,110	3185-02-S-35.030
	0.2 ... 30	~ 0.609	ISO 228-G³/₈″	630	9,000	± 0.7 % of FV	4,185	3185-03-S-35.030
	0.7 ... 70	~ 2.222	ISO 228-G¾″	420	6,000	± 0.6 % of FV	9,110	3185-04-S-35.030
	3.0 ... 300	~ 8.750	SAE flange 1¼″	420	6,000	± 0.7 % of FV	32,440	3185-05-S-35.030

HySense® QO

Oval wheel counter to measure small volume flow rates. They are robust, simple and easy-to-use and cover a broad viscosity range. Due to a modular construction they are suited for a large variety of media.

Technical data

Measuring principle	replacement (oval wheels)
Viscosity range	acc. to model (see order data)
Output signal	frequency (PNP)
Electrical measuring connector	M16 x 0.75, 6 pole (plug)
Mechanical measuring connector	acc. to measuring range (see order data)
Protection type	IP 67 (QO 100, QO 200) / IP 50 (QO 300)
Materials	Aluminium, PPS (QO 100, QO 200) / Aluminium (QO 300)
Sealing material	FKM (QO 100) / NBR (QO 200) / Compound 19457 (QO 300)
Weight	acc. to model (see order data)

Operating limits

Mounting orientation	horizontal (oval wheel axes must stand vertically)
Supply voltage	10 ... 30 VDC
Current consumption	≤ 200 mA
Error limits	≤ ± 0.5 % (QO 100, QO 200) / ± 0.3 ... ± 1.0 % (QO 300)
Medium temperature range	-10 ... +70 °C (QO 100) / -10 ... +80 °C (QO 300)
Operation temperature range	-10 ... +60 °C (QO 100) / -10 ... +55 °C (QO 200) / -20 ... +65 °C (QO 300)
Storage temperature range	-10 ... +70 °C (QO 100) / -10 ... +55 °C (QO 200) / -20 ... +65 °C (QO 300)

Order data

Model	Measuring range	Viscosity range	Mechanical measuring connectory	Max. working pressure		Weight	Order Nº
	l/min	cSt		bar	PSI	g	
QO 100	0.1 ... 1.0	1.0 ... 150	int. thread G$^1/_8$″	40	580	820	F130-11-11.11
QO 200	0.2 ... 2.0	1.5 ... 150	int. thread G½″	40	580	2,200	F240-16-13.31
	0.5 ... 5.0	1.5 ... 150	int. thread G½″	40	580	2,400	F340-16-13.31
	1,0 ... 10	1.5 ... 150	int. thread G½″	40	580	2,700	F440-16-13.31
QO 300	0.1 ... 1.0	3.0 ... 2,300	int. thread G¾″	16	232	1,400	F740-57-35.64

HySense® QL 100

Proven measuring turbine with attached manual restrictor valve to determine characteristic curves of pumps. Measures according to the flow principle, available with frequency or analog output signal.

Technical data

Measuring principle	flow (turbine)
Viscosity range	30 cSt (calibration) / 1... 100 cSt (possible range)
Output signal	frequency (QL 100) / 4 ... 20 mA (QL 110)
Electrical measuring connector	M16 x 0.75, 6 pole (plug)
Mechanical measuring connector	ISO 228-G1″
Protection type	IP 67 (QL 100) / IP 54 (QL 110)
Materials	high-grade steel X12CrNiS18 (casing) / 1.4122, 1.0718 (turbine wheel)
Sealing material	FKM
Weight	acc. to model (see order data)

Operating limits

Mounting orientation	arbitrary
Supply voltage	12 ... 24 VDC
Current consumption	12 ... 15 mA (QL 100) / 24 ... 31 mA (QL 110)
Error limits	acc. to model (see order data)
Response time	0.5 ms (QL 100) / 250 ms (QL 110)
Temperature ranges	-20 ... +85 °C (operation, storage) / ≤ 120 °C (medium)

Order data

Model	Output signal	Measuring range	Max. working pressure		Error limits	Weight	Order Nº
		l/min	bar	PSI		g	
QL 100	frequency	15 ... 300	350	5,000	± 0.5 % v.MW	4,325	31VB-71-S-35.030
QL 110	4 ... 20 mA	15 ... 300	350	5,000	± 0.7 % v. EW	4,435	31GB-71-S-35.030

Minimess® 1620 measuring point

HySense® RS 200

Minimess® 1620 p/T measuring point

manual restrictor valve
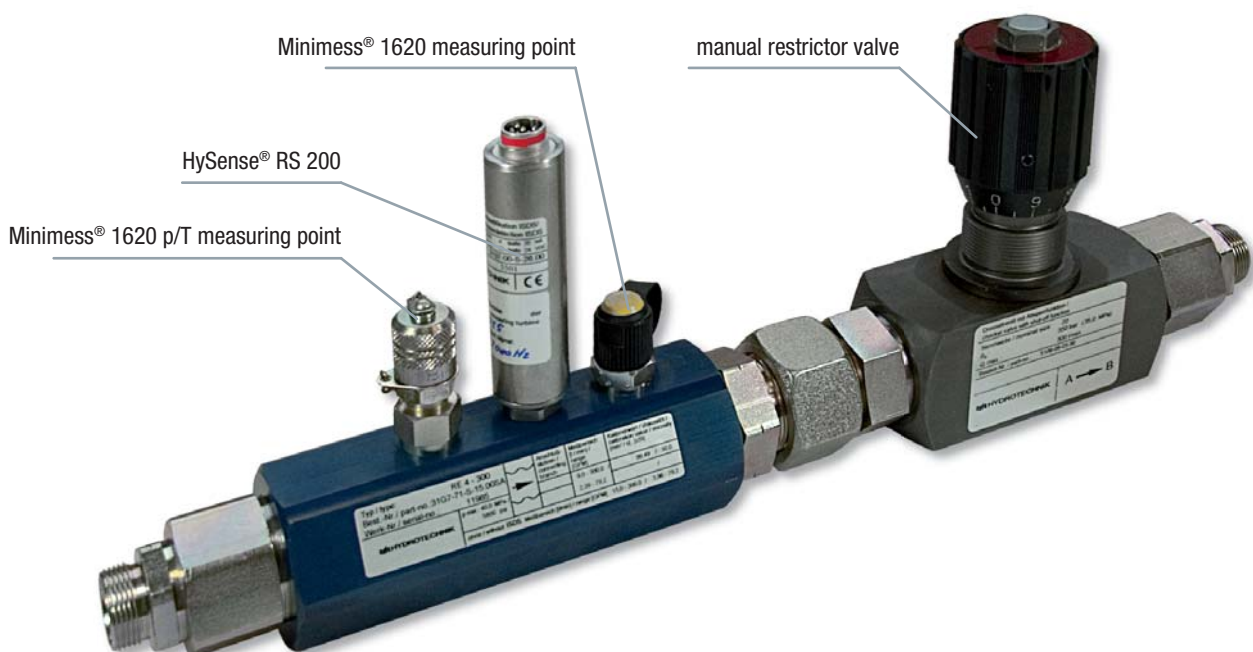
HySense® QL 200

Specially designed measuring turbine with integrated manual restrictor valve to determine the characteristic curves of pumps. Measured according to the flow principle, available with frequency or analog output signal.

Technical data

Measuring principle	flow (turbine)
Viscosity range	30 cSt (calibration) / 1... 100 cSt (allowed range)
Output signal	frequency (QL 200) / 4 ... 20 mA (QL 210)
Electrical measuring connector	M16 x 0.75, 6 pole (plug)
Mechanical measuring connector	ISO 228-G1¼˝
Protection type	IP 67 (QL 200) / IP 54 (QL 210)
Materials	3.4365 (casing) / 1.0718 (turbine wheel)
Sealing material	FKM
Weight	acc. to model (see order data)

Operating limits

Mounting orientation	arbitrary
Supply voltage	12 ... 24 VDC
Current consumption	12 ... 15 mA (QL 200) / 24 ... 31 mA (QL 210)
Error limits	acc. to model (see order data)
Response time	0.5 ms (QL 200) / 250 ms (QL 210)
Temperature ranges	-20 ... +85 °C (operation, storage) / ≤ 120 °C (medium)

Order data

Model	Output signal	Measuring range	Max. working pressure		Error limits	Weight	Order N°
		l/min	bar	PSI		g	
QL 200	frequency	12 ... 600	420	6,000	± 0.5 % v.MW	6,520	31VB-72-35.030S2
QL 210	4 ... 20 mA	12 ... 600	420	6,000	± 0.7 % v. EW	6,630	31GB-72-35.030S2

Minimess® 1620 measuring point

manual restrictor valve

HySense® RS 200 / RS 210

Minimess® 1620 p/T measuring point

Minimess® 1620 p/T measuring point

HySense® QL 326

Load valve with pressure limitation valve and pre-amplifier designed for pump tests. The recording of the characteristic curve dependant on pressure can be executed recisely and repeatedly by programming the desired pressure curve.

Technical data

Measuring principle	flow (turbine)
Viscosity range	30 cSt (calibration) / 1... 100 cSt (allowed range)
Output signal	CAN (usable for measuring and control communication, too)
Electrical measuring connector	M12x1, 5 pole (plug)
Mechanical measuring connector	ISO 228-G1¼˝
Protection type	IP 54
Materials	3.4365 (casing) / 1.0718 (turbine wheel)
Sealing material	FKM
Weight	see order data

Operating limits

Mounting orientation	arbitrary
Supply voltage	12 ... 24 VDC
Current consumption	max. 1 A
Error limits	see order data
Response time	≤ 50 ms
Temperature ranges	-20 ... +85 °C (operation, storage) / ≤ 120 °C (medium)

Order data

Model	Measuring range	Max. working pressure		Error limits	Weight	Order Nº
	l/min	bar	PSI	of MV	g	
QL 326	16 ... 600	420	6,000	± 0.5 %	7,500	31VB-72-P5.030C3

For safe operation we recommend to install an external pressure safeguarding. This must be provided by the customer, e.g. by installing a pressure limitation valve upstream of the load valve, or via the upstream hydraulic system.

HySense® RS 226

HySense® PR 126

HySense® TE 126

Minimess® 1620 measuring point

Control device

Electronically controlled pressure limitation valve
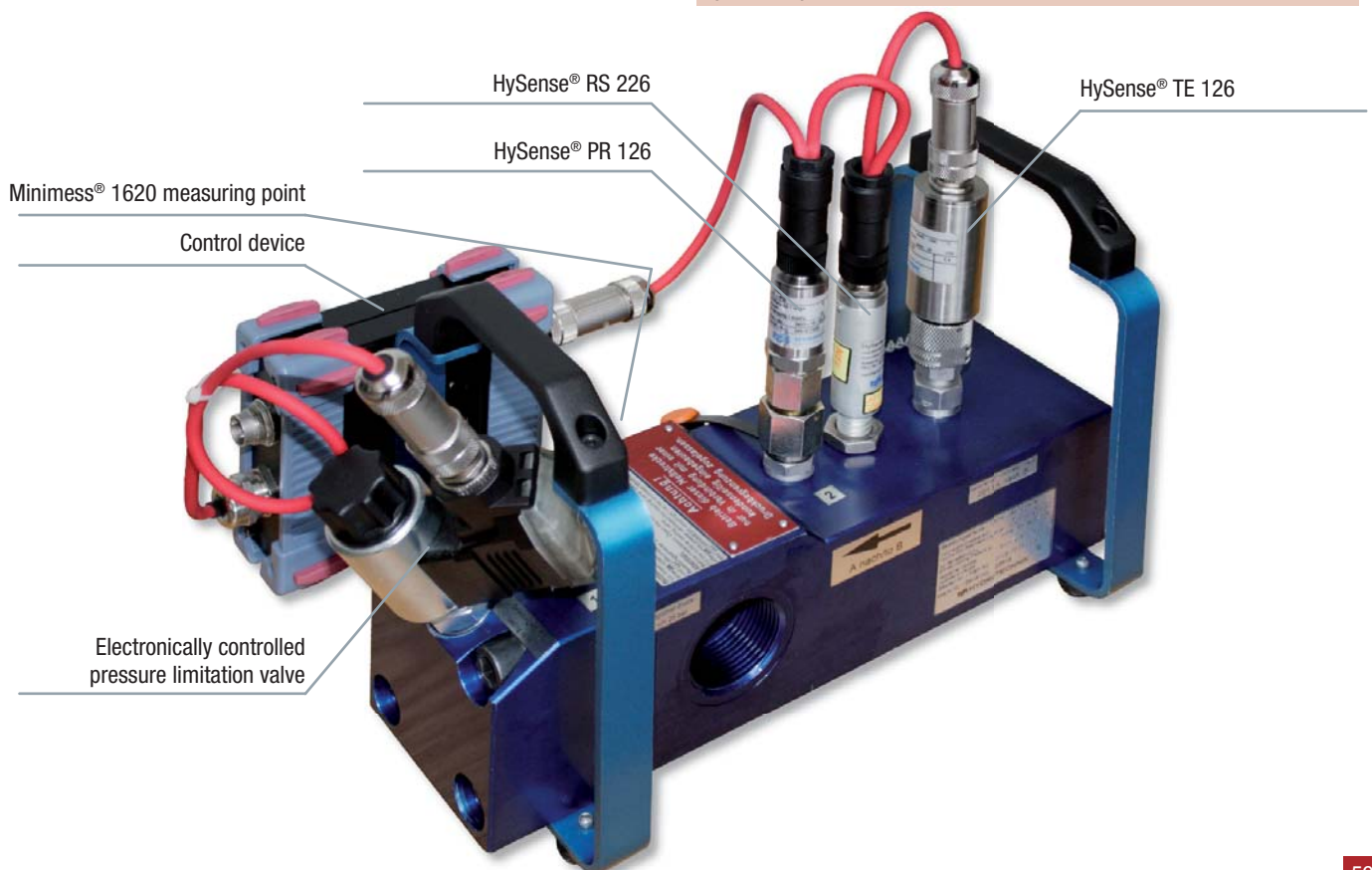
HySense® RS 110

Rotational speed sensor with reflection foil detection. Works with pulsating red light, a polarisation filter avoids disturbin reflections. The sensor measures reliably from distances up to 500 mm.

Technical data

Measuring principle	auto-collimation
Range	0 ... 500 mm (other ranges on request)
Output signal	frequency / 4 ... 20 mA (with f/I converter)
Electrical measuring connector	M16 x 0.75, 5 pole (plug)
Protection type	IP 67 (with screwed plug)
Material	Plastic (casing)
Weight	~ 141 g (frequency output signal) / ~ 320 (analog output signal)

Operating limits

Mounting orientation	arbitrary
Supply voltage	10 ... 30 VDC
Current consumption	< 30 mA
Response time	500 µs
Temperature ranges	-40 ... +60 °C (operation) / -40 ... +75 °C (storage)

Order data & Accessories

HySense® RS 110, frequency output signal (incl. 25 reflection badges)	3130-02-01.00
HySense® RS 110, output signal 4 ... 20 mA (incl. 25 reflection badges)	3130-06-01.00
HySense® RS 100*, output signal 4 ... 20 mA, ISDS (incl. 25 reflection badges)	3130-06-S-01.00
50 reflection badges	8840-02-01.01
Magnetic holder	3130-03-01.00

*: version for MultiHandy 2020

HySense® RS 210

Inductive sensor for special applications. Detects e.g. the teeth of cog wheels, then the rotational speed of the cog wheel can be calculated.

Technical data

Measuring principle	inductive (with integrated amplifying circuit)
Output signal	frequency (square wave)
Electrical measuring connector	M16 x 0.75, 5 pole (plug)
Protection type	IP 67 (with screwed plug)
Material	Aluminium (anodised)
Weight	~ 50 g

Operating limits

Mounting orientation	arbitrary
Supply voltage	6,5 ... 30 VDC
Current consumption	12 mA
Temperature ranges	-20 ... +85 °C (operation, storage)

Order data & Accessories

HySense® RS 210, frequency output signal, M10 x 0,75	3107-00-09.00
HySense® RS 210, frequency output signal, M14 x 1	31W7-00-09.00

Condition Monitoring

Condition Monitoring is the supervision of the status of a machine or plant, to draw conclusions on the demand for maintenance or repair measures from the changing of certain parameters. This allows to plan such measures exactly and possibly reduce downtimes significantly.

Beside measuring systems for the monitoring of measurands like pressure, temperature, volume flow rate, rotational speed a.s.o. Hydrotechnik also offers a particle counter for the diagnosis and supervision of the oil cleanliness in hydraulic systems.

Patrick the Particle Counter

Optical particle monitor working according to the light-extinction principle. Can be used to monitor the impurity level and the purity trend of liquids very accurately. The purity classes can either be displayed according to ISO4406:99 or SAE AS4059E.

✓ **Optical particle monitor:**
  detects pollutions in hydraulic oils

✓ **Three in one:**
  stand-alone particle monitor, sensor, Condition Monitoring

✓ **High usability:**
  displays particle size classes according to ISO or SAE

✓ **Flexible use:**
  data transfer via CAN, USB adaptor or RS 232

Operation type and limits

Measuring principle	light extinction
Working pressure	≤ 420 bar (dynamic) • ≤ 600 bar (static)
Allowed fluids	mineral and ester fluids, biologic oils
Allowed fluid temperature	-20 ... +80 °C
Operation temperature	-20 ... +80 °C (at 0 ... 95 % rel. humidity)
Allowed volume flow rate	50 ... 400 ml/min

Qualities

Signal output	4 ... 20 mA
Interfaces	RS 232, CANopen
Fluid connectors	2x Minimess® ¼", screw series 1620
Electrical connector	M12 x 1, 8 pole
Measuring range	4 ... 25 (purity grade acc. to ISO 4406:99)
Measuring accuracy	± 1 purity class
Supply voltage	9 ... 36 V DC
Current consumption	65 ... 180 mA (due to supply voltage)

Patrick the Particle Counter Order data

Single unit

Range of delivery	Order Nº
Patrick the Particle Counter	3160-00-76.00
• **HYDRO***com* 6 Base	

Accessories – Cables

CAN connection to existing system environment	plug M12x1, 8 pole – open cable ends	2.5 m	8824-T1-02.50
		5.0 m	8824-T1-05.00
		10.0 m	8824-T1-10.00
CAN connection to MultiSystem 5060 Plus and MultiSystem 4010	plug M12x1, 8 pole – plug M12x1, 8 pole Y distributor required	2.5 m	8824-T2-02.50
		5.0 m	8824-T2-05.00
		10.0 m	8824-T2-10.00
CAN connection to MultiSystem 5060	jack M12x1, 8 pole – Mini DIN plug, 8 pole Y distributor and separate power supply required	2.5 m	8824-T3-02.50
		5.0 m	8824-T3-05.00
		10.0 m	8824-T3-10.00
Connect Patrick to PC	plug M12x1, 8 pole – USB plug	2.0 m	8824-T4-02.00
CAN connection to MultiSystem / MultiControl 8050	plug M12x1, 8 pole – plug D-sub, 9 pole Y distributor and separate power supply required	2.0 m	8824-T5-02.00
		5.0 m	8824-T5-05.00
CAN connection to MS 5060 Plus and MS 4010	jack – plug M12x1, 8 pole, use without Y distributor	2.5 m	8824-T6-02.50
		5.0 m	8824-T6-05.00
		10.0 m	8824-T6-10.00
Connect Patrick to RS 232 interface	plug M12x1, 8 pole – jack D-sub, 9 pole	1.0 m	8824-T7-01.00
		2.0 m	8824-T7-02.00
		5.0 m	8824-T7-05.00

Accessories – Others

Power pack with country-specific adaptors		8812-00-00.36
Car connection cable, 12 ... 24 V DC, 5.0 m		8824-T8-05.00
Y distributor, M12x1, 8 pole, jack to plug / jack		8808-50-01.03
Minimess® hose 1620*, e.g. 1.5 m		S110-AC-AC-0150
Minimess® measuring point 1620 ISO 228-G¼˝, form F, sealing NBR	with faceplate 0.22 mm	2103-01-18.00F1N
	with faceplate 0.30 mm	2103-01-18.00F2N
	with faceplate 0.18 mm	2103-01-18.00F3N
Minimess® flow controller, deceleration valve cartridge, Ø 0.4 mm, mesh 125 µm		2103-A0-02.00

*: further Minimess® products and hose assemblies are contained in our Minimess® catalog

Software Products

HYDRO*com* 6

✓ **Proceed data:** transfer, import, export

✓ **Process data:** evaluate, analyse, prepare

✓ **Present data:** diagrams, tables, histograms, ...

✓ **Document measurements:** test reports, measuring protocols, QA reports

HYDROcom 6 Professional (3 licenses)	8874-19-01.01
HYDROcom 6 Full (3 licenses)	8874-19-01.02
HYDROcom 6 Base	8874-19-01.03
Upgrade **HYDRO**com 6 Full to Professional (3 licenses)	8874-19-02.01
HYDROcom 6 Professional (15 licenses)	8874-19-03.01
HYDROcom 6 Full (15 licenses)	8874-19-03.03

HYDRO*link*

✓ **Remote control:** full control of all functions of the instrument

✓ **Collect measuring data:** measure online and save on the PC

HYDROlink (license for 1 measuring instrument)	8874-00-07.01

HYDRO*gen*
HYDRO*run*

✓ **Program measuring sequences:** to map test and measuring regulations

✓ **Standardise measuring tasks:** to increase quality and avoid errors

✓ **Document measuring data:** court-proof reconstructuion of all measuring steps

✓ **Easy programming:** by object-oriented function principle

HYDROgen (license for 1 measuring instrument)	8874-01-01.55
HYDROrun (execute **HYDRO**gen measuring sequences in PC or measuring instrument)	cont. in **HYDRO**gen

HYDRO*boot*

✓ **Firmware update:** keep your instruments topical

HYDROboot (license-free, download free of charge from www.hydrotechnik.com)	8874-00-06.01

Accessories – Signal cables

Measuring cable MKS 03

Shielded measuring cables M16 x 0.75 (6 pole) for all Hydrotechnik measuring instruments, available in two versions: standard for most applications and HighEnd for the use with rough environmental conditions

Standard

HighEnd

Cable	Protection type	Extr. force Nm	Beginning	End	Length m	Order Nº
Standard measuring cable	IP 40	160			2.5	8824-S1-02.50S
					5.0	8824-S1-05.00S
					10.0	8824-S1-10.00S
Standard extension	IP 40	160			10.0	8824-S3-10.00S
					20.0	8824-S3-20.00S
Standard sensor cable	IP 40	160			2.5	8824-S6-02.50S
					5.0	8824-S6-05.00S
					10.0	8824-S6-10.00S
HighEnd measuring cable	IP 67	300			2.5	8824-S1-02.50H
					5.0	8824-S1-05.00H
					10.0	8824-S1-10.00H
HighEnd extension	IP 67	300			10.0	8824-S3-10.00H
					20.0	8824-S3-20.00H
HighEnd sensor cable	IP 67	300			2.5	8824-S6-02.50H
					5.0	8824-S6-05.00H
					10.0	8824-S6-10.00H

Measuring cable MK 15

Shielded measuring cable M16 x 0.75 (5 pole) with open cable ends to connect the stationary measuring devices SEG 1060 and Compare

Cable	Protection type	Extr. force Nm	Beginning	End	Length m	Order Nº
Standard measuring cable	IP 40	160			2.5	8824-C1-02.50Y
					5.0	8824-C1-05.00Y
					10.0	8824-C1-10.00Y

Separator cable

Shielded measuring cables to connect the combined sensor TP 180 to Hydrotechnik measuring instruments; one jack M16 x 0.75 (8 pole) is separated to two plugs M16 x 0.75 (5 pole)

Cable	Protection type	Extr. force Nm	Beginning	End	Length m	Order Nº
Standard meas. cable	IP 40	160			2.5	8824-D6-02.50
					5.0	8824-D6-05.00

Accessories – Signal cables

Connection cable MultiEPC

Shielded connection cables M12 x 1 (5 pole) to connect the Hydrotechnik pressure switch MultiEPC, available in straight and angled versions

Cable	Version	Beginning	End	Length (m)	Order Nº
Pressure switch connection cable	straight			2.0	8824-L0-02.00
				5.0	8824-L0-05.00
				10.0	8824-L0-10.00
Pressure switch connection cable	90°			2.0	8824-L1-02.00
				5.0	8824-L1-05.00
				10.0	8824-L1-10.00

Connection cable Patrick

Shielded cables M12 x 1 (8 pole) to connect the particle counter Patrick to Hydrotechnik measuring instruments or other environments

Cable	Beginning	End	Length	Order Nº
CAN connection to existing system environment	M12x1, 8 pole		2.5 m	8824-T1-02.50
			5.0 m	8824-T1-05.00
			10.0 m	8824-T1-10.00
CAN connection to MultiSystem 5060 Plus and MultiSystem 4010 incl. Y distributor	M12x1, 8 pole	M12x1, 8 pole	2.5 m	8824-T2-02.50
			5.0 m	8824-T2-05.00
			10.0 m	8824-T2-10.00
CAN connection to MultiSystem 5060	M12x1, 8 pole	Mini-DIN, 8 pole	2.5 m	8824-T3-02.50
			5.0 m	8824-T3-05.00
			10.0 m	8824-T3-10.00
Connect Patrick to a PC	M12x1, 8 pole	USB	2.0 m	8824-T4-02.00
CAN connection to MultiSystem / MultiControl 8050	M12x1, 8 pole	D-Sub, 9 pole	2.5 m	8824-T5-02.50
			5.0 m	8824-T5-05.00
			10.0 m	8824-T5-10.00
CAN connection to MS 5060 Plus and MS 4010	M12x1, 8 pole	M12x1, 8 pole	5.0 m	8824-T6-05.00
			10.0 m	8824-T6-10.00
Connect Patrick to a RS 232 interface	M12x1, 8 pole	D-Sub, 9 pole	2.5 m	8824-T7-02.50
			5.0 m	8824-T7-05.00
			10.0 m	8824-T7-10.00

Connection cable MultiMeter

	Length	Order Nº
… for MultiSystem 5060 Plus and MultiSystem 4010	2.0 m	8824-R6-02.00

Shielded cable to connect the MultiMeters Voltcraft VD to the RS 232 interface of Hydrotechnik measuring instruments.

Accessories – CAN

Connection cables measuring instruments

Shielded cables to connect a CAN line to Hydrotechnik measuring instruments. Use these cables to connect the MultiXtend modules with CAN output, too.

Measuring instrument	Beginning	End	Length	Order Nº
MultiSystem 5060 to CAN sensor or MultiXtend	Mini-DIN 8 pole	M12 x 1 5 pole	2.5 m	8824-M5-02.50
			5.0 m	8824-M5-05.00
			10.0 m	8824-M5-10.00
MultiSystem 5060 to CAN	Mini-DIN, 8 pole		5.0 m	8824-M2-05.00
MultiSystem 4010 / 5060 Plus to CAN sensor or MultiXtend	M12x1, 8 pole	M12x1, 5 pole	2.5 m	8824-R7-02.50
			5.0 m	8824-R7-05.00
			10.0 m	8824-R7-10.00
MultiSystem 4010 / 5060 Plus to CAN	M12x1, 8 pole		5.0 m	8824-R9-05.00
MultiSystem / MultiControl 8050 to CAN sensor or MultiXtend	D-Sub, 9 pole	M12x1, 5 pole	2.5 m	8824-N1-02.50
			5.0 m	8824-N1-05.00
			10.0 m	8824-N1-10.00

CAN connection cables

Shielded cables to build-up a CAN line.

Measuring instrument	Beginning	End	Length	Order Nº
Connect MultiXtend or CAN sensors	M12x1, 5 pole	M12x1, 5 pole	1.0 m	8824-N3-01.00
			2.5 m	8824-N3-02.50
			5.0 m	8824-N3-05.00
Connect MultiXtend or CAN sensors to an existing CAN environment	M12x1, 5 pole		1.0 m	8824-M7-01.00
			2.5 m	8824-M7-02.50
			5.0 m	8824-M7-05.00
Connect MultiXtend or CAN sensors to an existing CAN environment		M12x1, 5 pole	1.0 m	8824-M8-01.00
			2.5 m	8824-M8-02.50
			5.0 m	8824-M8-05.00

8812-11-01.00

Other accessories

Y distributor M12x1 (5 pole), 2x plug, 1x jack	8808-50-01.01
Terminal resistor 120 Ω, plug M12 x 1 (5 pole)	8872-02-01.01
Power pack (table version) for CAN power supply, 115 / 230 V AC, plug M12x1	8812-00-00.34
Adaptor for Hydrotechnik standard power pack, plug M12x1	8812-11-01.00

8808-50-01.01   8872-02-01.01

Accessories – Minimess®

Measuring points with faceplate

Minimess® 1620, ISO 228-G¼˝ form F, sealing NBR, with faceplate 0.22 mm	2103-01-18.00F1N
Minimess® 1620, ISO 228-G¼˝ form F, sealing NBR, with faceplate 0.30 mm	2103-01-18.00F2N
Minimess® 1620, ISO 228-G¼˝ form F, sealing NBR, with faceplate 0.18 mm	2103-01-18.00F3N

p/T measuring points

Minimess® 1620 p/T, ISO 228-G¼˝ form F, sealing NBR, metal cap	2149-04-15.13N
Minimess® 1620 p/T, ISO 228-G¼˝ form F, sealing FKM, metal cap	2149-04-15.53N
Minimess® 1620 p/T, M10x1 form G, sealing NBR, metal cap	2149-04-19.13N
Minimess® 1620 p/T, M10x1 form G, sealing FKM, metal cap	2149-04-19.53N

Straight direct connectors

Minimess® 1215, ISO 228-G¼˝ internal (for HySense® PR 1xx, PR 4xx and MultiEPC)	2101-07-18.62N
Minimess® 1215, ISO 228-G¼˝ external (for HySense® PR 3xx)	2101-07-41.62N
Minimess® 1615, ISO 228-G¼˝ internal (for HySense® PR 1xx, PR 4xx and MultiEPC)	2102-07-18.62
Minimess® 1615, ISO 228-G¼˝ external (for HySense® PR 3xx)	2102-07-41.62
Minimess® 1620, ISO 228-G¼˝ internal (for HySense® PR 1xx, PR 4xx and MultiEPC)	2103-07-18.62N
Minimess® 1620, ISO 228-G¼˝ external (for HySense® PR 3xx)	2103-07-41.62N
Minimess® 1604, ISO 228-G¼˝ internal (for HySense® PR 1xx, PR 4xx and MultiEPC)	2106-07-18.62N

90° direct connectors

Minimess® 1215, ISO 228-G¼˝ internal (for HySense® PR 1xx, PR 4xx and MultiEPC)	2146-14-02.00N
Minimess® 1215, ISO 228-G¼˝ external (for HySense® PR 3xx)	2146-54-19.20N
Minimess® 1615, ISO 228-G¼˝ internal (for HySense® PR 1xx, PR 4xx and MultiEPC)	2146-57-05.00
Minimess® 1615, ISO 228-G¼˝ external (for HySense® PR 3xx)	2146-54-19.13
Minimess® 1620, ISO 228-G¼˝ internal (for HySense® PR 1xx, PR 4xx and MultiEPC)	2146-13-05.00N
Minimess® 1620, ISO 228-G¼˝ external (for HySense® PR 3xx)	2146-54-19.40N

Flow controller

Minimess® 1620, deceleration valve cartridge, Ø 0.4 mm, mesh 125 µm	2103-A0-02.00

Further Minimess® products are contained in our Minimess® catalog.

Accessories – Power supply

Power packs and cables

Table	MS/MC/MP 8050	90 ... 265 V AC, 47 ... 63 Hz – 24 V DC, 60 W	8812-00-00.27
	MS 4010/5060/Plus	100 ... 240 V AC – 24 V DC, 630 mA	8812-02-01.00
	MH 3020/3050	100 ... 240 V AC – 24 V DC, 630 mA	8812-02-01.00
Plug	MS 4010/5060/Plus	115 ... 230 V AC – 24 V DC, incl. country-spec. adaptors	8812-20-02.00
	MH 3020/3050	115 ... 230 V AC – 24 V DC, incl. country-spec. adaptors	8812-20-02.00
	MB 306x		8812-00-00.35
	MH 2020	incl. country-specific adaptors	8812-00-00.33
	Patrick	incl. country-specific adaptors	8812-00-00.36
Car	MS 4010/5060/Plus	Connection cable, 5.0 m	8824-64-05.00
	MH 2020	12 ... 24 V DC – 6 V DC	8812-09-04.00
	Patrick	Connection cable, 5.0 m	8824-T8-05.00

Plug version

Table version

Batteries

MultiSystem 5060 / 5060 Plus	14.4 V DC, 2,000 mAh, with temperature sensor	8873-07-01.00
MultiSystem 5050	14.4 V DC, 1,200 mAh, NiCd	8873-02-00.07
MultiSystem 4010	14.4 V DC, 1,100 mAh, NiMH	8873-08-02.00
MultiBox 306x	BatteryPack, 14.4 V DC, 2,000 mAH	8873-30-01.00
MultiHandy 3050	14.4 V DC, 1,800 mAh, NiMH	8873-08-01.00
MultiHandy 3020 / 3025	14.4 V DC, 1,100 mAh, NiMH	8873-08-02.00

Accessories – Others

Protection and comfort

MultiSystem 8050	Notebook bag	8875-01-06.00
MultiSystem 5060 / 5060 Plus	Artificial leather bag	8875-01-07.00
MultiSystem 4010 / 5060 Plus	Neck strap set with holders	8854-00-00.01
MultiHandy 3050	Nylon bag	8875-01-05.00
MultiHandy 3020 / 3025	Nylon bag	8875-01-02.00

Mounting

MultiSystem 4010 / 5060 Plus	Set with cap rail, clip and screws	8854-00-00.02
MultiSystem 4010 / 5060 Plus	Velcro tape set (5 pieces)	8840-00-00.13

Accessories – Others

Transportation cases

8859-02-02.03

8854-15-00.14K

MultiSystem/MultiControl 8050	plastic case with bottom compartment	3160-00-65.03
MultiSystem 4010 / 5060 Plus	black, with compartments for turbine/Patrick/MultiXtend	8859-02-02.03
MultiSystem 4010 / 5060 Plus	red, with foam inlays	8854-15-00.14K
MultiBox 306x	plastic, with turbine compartment	3160-00-62.09
MultiHandy 3020 / 3025 / 3050	plastic, with turbine compartment	3160-00-62.06
MultiHandy 2020	plastic, red	3160-00-69.01

Data

Data CD		8874-16-00.01

Sensor accessories

3130-03-01.00

Inductive sensor, ISDS, IP 67 (for HySense® QT 1xx / 2xx)	M10 x 0.75	3107-00-S-09.00
	M14 x 1	31W7-00-S-09.00
Inductive sensor, ISDS, IP 67 (for HySense® QL 100)	M10 x 0.75	3107-00-S-09.70
	M14 x 1	31W7-00-S-09.70
Inductive sensor with f/I converter, ISDS, 0 ... 20 mA, IP 67 (for HySense® QT/QL x1x)	M10 x 0.75	3107-00-S-25.00
	M14 x 1	31W7-00-S-25.00
Inductive sensor with f/I converter, ISDS, 4 ... 20 mA, IP 67 (for HySense® QT/QL x1x)	M10 x 0.75	3107-00-S-26.00
	M14 x 1	31W7-00-S-26.00
GMR sensor, ISDS, frequency (for HySense® QG 1xx)		3107-00-S-45.00
Reflection strap set, 50 pc., 25 x 10 mm (for HySense® RS 110)		8840-02-01.01
Magnetic holder (for HySense® RS 110)		3130-03-01.00

8840-02-01.01

3107-00-S-25.00

3107-00-S-09.00

Simulator

| Signal generator	2x analog, 1x frequency	3160-00-00.43

Service & Support

Maintenance

Regular maintenance is important for the functionality and value retention of your measuring technology investment. We inspect and clean all Hydrotechnik measuring instruments and replace used batteries or defective parts at reasonable cost.


Calibration

Only calibrated measuring instruments provide reliable measured values in the long run. We use precise laboratory installations to detect and compensate possible deviations of measuring devices. We are a certified DKD calibration laboratory and offer calibrations of all sensors, too, most suitable as measuring chain together with the instrument.
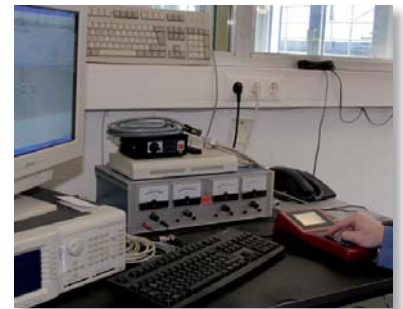
Repair

Hydrotechnik measuring instruments are robust, reliable and long-living. In any case of damage, we repair in a fast and cost-effective way. A rental item can be provided during the repair time.
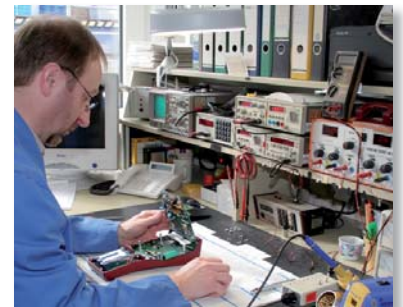
Service Packages

We offer service packages for all Hydrotechnik measuring instruments to maintain their quality and functionality for a long time:

Service package Basic

- Cleaning of the casing
- Inspection of inputs, outputs, interfaces and keypad
- Execution of a memory test
- Renewal of identification and information labels
- Inspection and capacity test of the batteries
- Inspection of the interior for damages
- Measuring and control of the buffer battery
- Firmware update

Service package Plus

- Calibration and compensation of all measuring channels
- Completion of the calibration certificate
- Attachment of the calibration label

Service package Professional

- All elements of the service packages Basic and Plus

Notes

HYDROTECHNIK