HYDROTECHNIK

Section 2

Digital test & datalogging equipment

Software

Measuring Sensors, adaptors & accessories

HYDROTECHNIK
FLOWTECHNIK

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Hydrotechnik - Contents page

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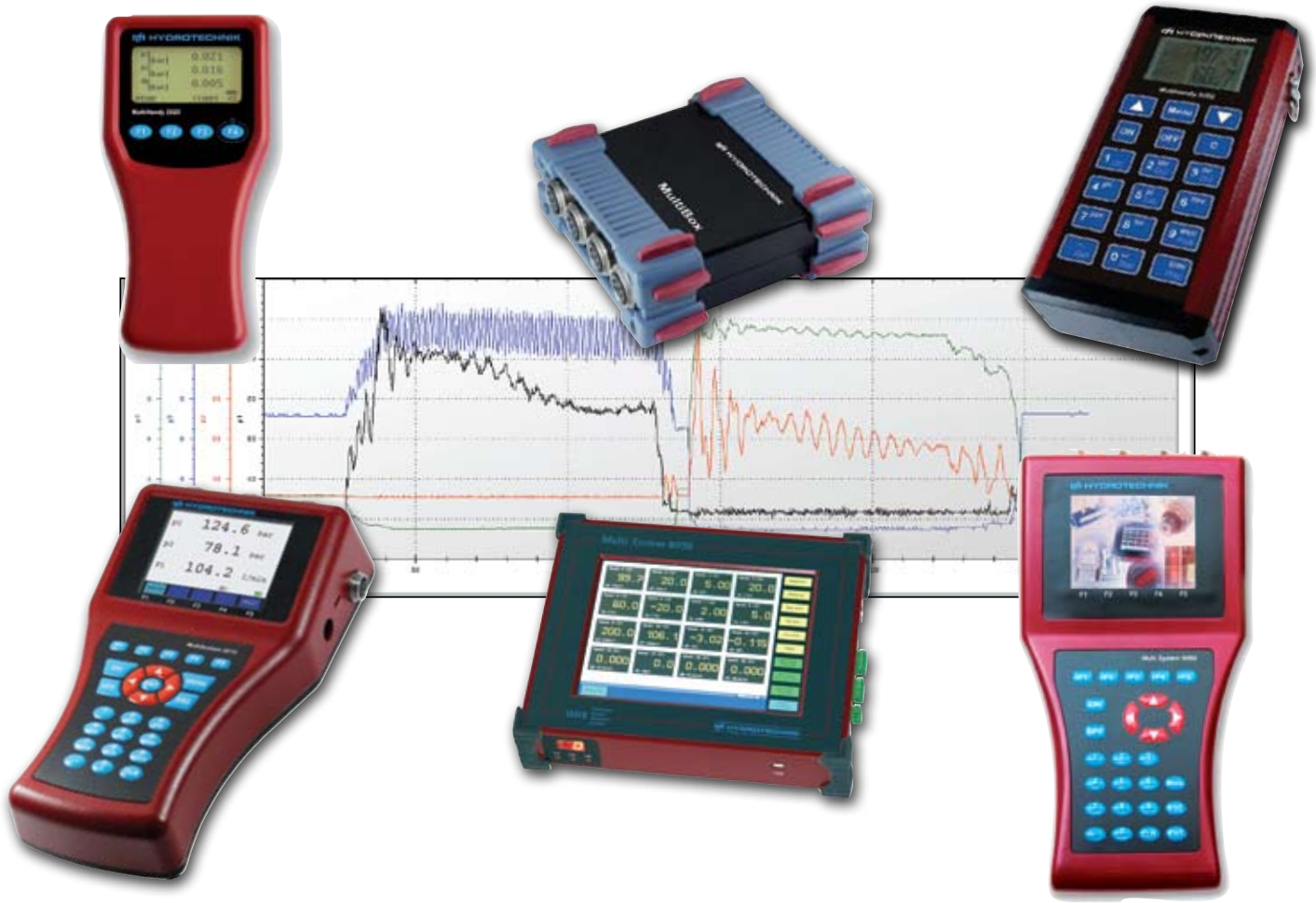
Introduction

Today's fluid power systems are more sophisticated and more powerful than ever before. These advanced systems require accurate test and analysis data in order to truly understand and optimise performance.

Test and high speed data aquisition also help to fault find when performance drops off or components are faulty.

With the wide range of instrumentation and sensors available from Hydrotechnik, we can offer you the perfect test solution to suit your budget. High scanning rates, excellent accuracy and proven reliability make Hydrotechnik test equipment the natural choice within the industry. From component manufacturers to system builders, Hydrotechnik is the defacto standard.

All our hand held data logging instruments are compatible with the powerful HYDROcom6 analysis software package. HYDROcom6 is undoubtedly one of the most powerful hydraulic diagnostic software packages available today. The combination of accurate instrumentation and powerful software are proving to be invaluable tools to R&D and service engineers in the quest for greater component efficiency and overall system performance. HYDROcom6 allows detailed analysis, zoom, overlay and archiving for historical reporting.



Overview of measurement devices

Multi System units
Advanced, multi-channel measuring systems

Advanced, Multi channel test and data acquisition units designed to integrate into production test, R&D or end of line production testing Hydrotechnik can test and log up to 24 channels at 100ms.

MultiSystem 4010

MultiSystem 5060

MultiSystem 8050

Multi Handy units
Industrial measuring systems

A range of hand held test and high speed data acquisition, priced for all budgets and system requirements.

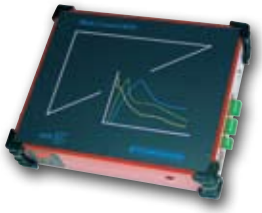
MultiHandy 2020

MultiHandy 3020

Multi Box & Multi Control units
Blind Data logger systems

Well protected black box measuring units for the use under demanding conditions, e.g. during test runs or the all-day use of a machine. Various instrument versions for different requirements.

MultiBox 3060/3061/3065



MultiControl 8050

ISDS Intelligent Sensor Detection System

All Hydrotechnik instruments support ISDS functionality. ISDS is the automatic transmission of parameters and calibration data from Hydrotechnik sensor to the measuring instrument: Connect – Switch on – Measure.
This ensures a higher degree of accuracy as all transducer linearisation data is automatically transferred to the test units and eliminates potential programming error.

Custom built measurement systems

Hydrotechnik can also provide bespoke test rigs and software systems for production or end of line testing for quality and performance testing. Systems can be designed and built to suit specific customer requirements both in rig design and software functionality. Contact us for more details.

MultiHandy 2020

Low cost, robust 2 channel test and data logging, setting new standards

The 2020 digital pressure test kit has powerful features giving excellent 2 channel test and system analysis. The 2020 kit is supplied with two pressure transducers which the unit recognises when plugged in (ISDS - Automatic transfer of pressure sensor data- range and lineration diagnostics ensures higher accuracy and ease of use). The 2020 has a 60,000 readings memory and backlit display, 1ms scanning rate and also can be used with a Hydrowin software all for an unbelievable low price. Other ISDS sensors such as flow meters or temperature probes can be used with the 2020 to extend its useability.

Ordering Information

Pressure ranges	Part number
2x 0 to 600 bar	3160-18-18-69.00
2x 0 to 400 bar	3160-15-15-69.00
2x 0 to 200 bar	3160-10-10-69.00
1x 0 to 60 bar 1x 0 to 600 bar	3160-21-18-69.00
2x 0 to 60 bar	3160-21-21-69.00
1x -1 to 6 bar 1x 0 to 60 bar	3160-32-21-69.00

All models are 2x analogue
Only available in Measuring Kit

Everything included

The measuring case contains everything you need.

Everything provided

Sensor connectors USB interface and power input.

Simply good

Easy to operate selectable menus via 4 buttons.

- Two analogue measuring inputs for 0 or 4 to 20 mA
- 12 bit Analog/Digital-converter
- Automatic calculation of the difference of two measuring channels Δ P
- LCD graphic display with switchable backlight and automatic display adaption
- 128 kB of measuring memory (60.000 readings)
- Scanning rate from 1 ms up to 1 minute
- Min & Max readings
- Simple operation with only four keys
- Light plastic housing with battery compartment for rechargeable batteries
- Fast data transmission via USB

MultiHandy 2020

Technical Data

Channels

Analogue channels	2 (0/4 ... 20mA or Hydrotechnik ISDS)
measuring rate	1 kHz
error limit	± 0.2% FS
electrical connection	6-pole jack, compatible to DIN 45 322, IEC 60130-9
Virtual channels	1 (differential calculation)

Memory value

Type	Flash 128 kB
Max. number of measuring series	1
Max. number of values per series	60,000
Recording rate	1 ms / 10 ms / 100 ms / 1 s / 10 s
Recording time (at recording rate 10 ms)	300 s (2 channels); 600 s (1 channel)

Equipment and features

Display	2.5“ sw-LCD, illuminated
Interface	USB 2.0 VART (virtual COM interface)
Power supply	Power pack (6 VDC / 850 mA), Batteries (NiMH / 2x AA / 2.4 V / 2,500 mAh)
battery performance1	10 h
Sensor power supply	12 V, 100 mA
Casing	ABS plastic
Dimensions (L x W x H)	~ 185 x 90 x 46 mm
Weight	~ 292 g
Protection type	IP 40
Operation temperature	0 ... 60 °C
Storage temperature	-20 ... +70 °C
Relative humidity	0 ... 80% r.H. (not condensing)

PC software options

Execute online measurements	HYDROcom	yes[1]	8874-13-01.02
Download measurement data			
Evaluate and present measurement data			

1: HYDROcom Basic

Full (Standard) HYDROcom6	Basic to full software upgrade*	8874-19-01.04

* Special upgrade package only when ordered with new instrument or kit

Spares & Accessories

Spares & Accessories	2020 Handheld unit only	3160-00-69.00
Power pack	100 ... 240 VAC, 50/60 Hz – 6 VDC/850 mA	8812-00-00.33
Car power supply	12 VDC – 6 VDC; cable length 4.0 m	8812-09-04.00
Batteries	2x AA, 1.2 V	8873-02-00.08
Transport case	Plastic, red	3160-00-69.01
USB cable	USB-A / USB-B: cable length 2.0 m	8824-F4-02.00

MultiHandy 3020

Robust 3 channel data logger, entry level unit for detailed hydraulic diagnosis

This is the entry level instrument for real detailed hydraulic diagnosis. The 3020 comes with three channels, internal memory of up to 1,000,000 readings, 1mS scanning rate, multi line backlit display and the basic version of HYDROcom6 making the unit an economic solution for measuring multiple channels simultaneously.

- 1,000,000 memory readings, 5 test memory
- Measuring rate: up to 1 ms
- Direct or menu controlled operation
- Robust aluminium housing
- Data transmission with USB interface

Ready for everything

Two analogue, a frequency input and a calculated channel with min & max values

State-of-the-Art

Fast data downloaded via USB

When the going gets tough

Solid aluminium casing protects the electronics.

Easy to operate

Easy to use interface.

Ordering Information

	Power pack with adaptors	USB cable 2.0 m	Data CD	Minimess® 1620 direct connector	Pressure sensor PR 100 (HT-PD)	Temperature sensor TE 100	Measuring turbine QT 100 (RE4)	Measuring cable, 5.0 m	Transport case, plastic	
MultiHandy 3020	✓	✓	✓	x	x	x	x	x	x	3160-00-72.00
3020 pressure measuring kit	✓	✓	✓	2x	2x	x	x	2x	✓	3020-pp-xx[1]-xx[1]
3020 pressure & temperature measuring kit	✓	✓	✓	1x	1x	✓	x	2x	✓	3020-pT-xx[1]-xx[1]
3020 pressure, temperature & flow measuring kit	✓	✓	✓	1x	1x	✓	✓	3x	✓	3020-pTQ-xx[1]-xx[1]-yy[2]

1: xx is the measuring range code, see order data pressure sensor HySense© PR 100
2: yy is the measuring range code, see order data volume fl ow rate sensor HySense© QT 100

- Two analogue measuring inputs for 0 to 20 mA or 4 to 20 mA
- LCD display with eight lines
- One frequency input to max. 5 kHz
- Calculated values from two measuring channels for pressure difference, sum, power and the function y = f (t)

MultiHandy 3020

Technical Data

Channels

Analogue channels	2 (0/4 ... 20mA or Hydrotechnik ISDS)
measuring rate	1 kHz
error limit	± 0.2% FS
electrical connection	6-pole jack, compatible to DIN 45 322, IEC 60130-9
Frequency channels	1 (Standard or Hydrotechnik ISDS)
signals	0.25 Hz ... 5 kHz
measuring rate	~10 ms
error limit	± 0.2% of measured value
electrical connection	6-pole jack, compatible to DIN 45 322, IEC 60130-9
Virtual channels	1 (difference, sum or hydraulic power)

Memory values

Type	Flash 2 MB
Max. number of measuring series	14
Max. number of values per series	1,000,000 (analog), 333,000 (frequency)
Recording rate	1 ms ... 10 min
Recording time (at recording rate 10 ms)	1 s ... 999 h
Number of triggers	1
Pretrigger	0 ... 100%

PC software options

Firmware update	✓	HYDROboot	8874-14-11.01
Execute online measurements	✓[1]	HYDROcom	8874-13-01.02
Download measurement data	✓[1]	HYDROcom	8874-13-01.02
Evaluate and present measurement data	✓[1]	HYDROcom	8874-13-01.02

1: HYDROcom Basic

Full (Standard) HYDROcom6	Basic to full software upgrade*	8874-19-01.04

* Special upgrade package only when ordered with new instrument or kit

Spares & Accessories

Power pack	110/240 VAC, 50/60 Hz – 24 VDC/630 mA	8812-20-02.00
Table-top power pack	100/240 VAC, 50/60 Hz – 24 VDC/630 mA	8812-02-01.00
Car power supply	12 VDC – 24 VDC; cable length 5.0 m	8824-64-05.00
Batteries	NiMH; 14.4 V; 1,100 mAh	8873-08-02.00
USB cable	Plug USB-A/-B; highspeed USB 2.0; 2.0 m	8824-F4-02.00
Transport case	Plastic, black, with volume flow sensor box	3160-00-62.06
Protective bag	Nylon, black, front transparent film	8875-01-02.00

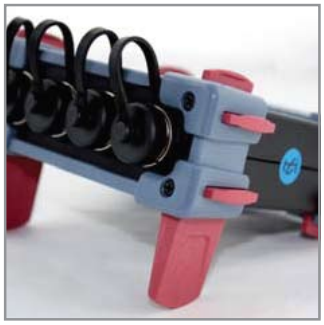
MultiBox 3060 / 3061 / 3065

User friendly 4 channel Black Box datalogger

The MultiBox 3060 series of instruments are robust 4 channel "Black Box" Dataloggers, designed for in house diagnostic measuring or long term measurements in the field. Set up and control is made via the attractive HYDROwork software for real time monitoring or datalogging. Units can be powered from the PC/Laptop USB port, individual power charger or stand alone battery.

- MultiBox 3060 — the measuring box with four channels; power supply from Computer via USB
- MultiBox 3061 — the data logger with internal memory; power supply via USB, or from optional Battery pack or power pack
- MultiBox 3065 — the flexible with internal memory and Ethernet interface; can be used as measuring box or data logger, too

Well protected



Stable metal casing, edge protectors and IP 54 protection against humidity.

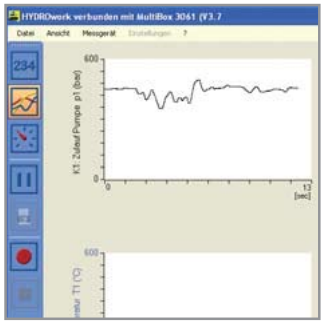
Universal use

Three device versions for different requirements. Mobile or stationary, as measuring box or as data logger.

Independent data logger

The optional battery pack allows use anywhere in demanding environmental conditions.

Easy operation



HYDROwork is the intuitive software for PC. For configuration, download and online measurements.

Ordering Information

	Power pack with adaptors	USBcable 2.0 m	Data CD	Minimess® 1620 direct connector	Pressure sensor PR 100	Temperature sensor TE 100	Measuring turbine QT 100	Measuring cable, 5.0 m	Transport case, plastic	
MultiHandy 3060	x	✓	✓	x	x	x	x	x	x	3160-00-00.85 / .95[3]
3060 pressure measuring kit	x	✓	✓	2x	2x	x	x	2x	✓	3060-pp-xx[1]-xx[1]
3060 pressure & temperature measuring kit	x	✓	✓	2x	2x	✓	x	3x	✓	3060-ppT-xx[1]-xx[1]
3060 pressure, temperature & flow measuring kit	x	✓	✓	2x	2x	✓	✓	4x	✓	3060-ppTQ-xx[1]-xx[1]-yy[2]
MultiHandy 3061	x	✓	✓	x	x	x	x	x	x	3160-00-00.86/.96[3]
3061 pressure measuring kit	✓	✓	✓	2x	2x	x	x	2x	✓	3061-pp-xx[1]-xx[1]
3061 pressure & temperature measuring kit	✓	✓	✓	2x	2x	✓	x	3x	✓	3061-ppT-xx[1]-xx[1]
3061 pressure, temperature & flow measuring kit	✓	✓	✓	2x	2x	✓	✓	4x	✓	3061-ppTQ-xx[1]-xx[1]-yy[2]
MultiHandy 3065	x	✓	✓	x	x	x	x	x	x	3160-00-00.87 /.97[3]
3065 pressure measuring kit	✓	✓	✓	2x	2x	x	x	2x	✓	3065-pp-xx[1]-xx[1]
3065 pressure & temperature measuring kit	✓	✓	✓	2x	2x	✓	x	3x	✓	3065-ppT-xx[1]-xx[1]
3065 pressure, temperature & flow measuring kit	✓	✓	✓	2x	2x	✓	✓	4x	✓	3065A-ppTQ-xx[1]-xx[1]-yy[2]

1: xx is the measuring range code, see order data pressure sensor HySense© PR 100
2: yy is the measuring range code, see order data volume flow rate sensor HySense© QT 100
3: .8x for analogue mA inputs, .9x for analogue V inputs

MultiBox 3060 / 3061 / 3065

Technical Data

Channels

Analogue channels standard signals	3 (0/4 ... 20mA or Hydrotechnik ISDS), 0....10V
measuring rate	1 kHz
error limit	± 0.1% FS
electrical connection	6-pole jack, compatible to DIN 45 322, IEC 60130-9
Measuring channels frequency	1 (Frequency/analogue switchable, with Hydrotechnik ISDS and direction detection)
signals	0/4 ... 20 mA, 0 ... 10 V / 1 Hz ... 5 kHz (w.o.d.d.), 1 Hz ... 10 kHz (w.d.d.)
measuring rate	1 kHz
error limit	± 0.2% of measured value
electrical connection	6-pole jack, compatible to DIN 45 322, IEC 60130-9
Virtual channels	2 (difference, sum, hydraulic power)

Memory values

Type	SD card 2 GB (MB 3061 / 3065)
Max. number of measuring series	200
Max. number of values per series	115 million
Recording rate	1 ms ... 1 min (in steps)
Individual scan rate	channel-related, settable in steps
Recording time	1 s ... 48 h (in steps)
Number of triggers	1 ... 4, linkable
Pretrigger	0 /10 /20 ... 100%

PC software options

Firmware update	HYDROboot	✓	8874-14-11.01
Instrument remote configuration	HYDROwork	✓	8874-14-17.01
Instrument remote operation			
Execute online measurements			
Download measurement data			
Evaluate and present measurement data	HYDROcom	✓[1]	8874-13-01.02

1: HYDROcom Basic

Full (Standard) HYDROcom6	Basic to full software upgrade*	8874-19-01.04

* Special upgrade package only when ordered with new instrument or kit

Accessories

Power pack	110/240 VAC, 50/60 Hz – 24 VDC/630 mA	8812-00-00.35
Car power supply	12 ... 24 VDC; cable length 5.0 m	8824-P5-05.00
Power supply cord	open cable ends; cable length 5.0 m	8824-P6-05.00
BatteryPack	IN 24 VDC / 600 mA; OUT 14.4 VDC; ~ 2 Ah	8873-30-01.00
USB cable	USB-A / Mini-USB-B; IP 67; 2.0 m	8824-P4-02.00
Transport case	Plastic, black, with box for measuring turbine	3160-00-62.09

Additional accessories (cables, Minimess© products, a.s.o.) in the section "Accessories"

MultiSystem 4010

Professional 5 channel data logger, perfect choice for detailed field service hydraulic diagnosis

The 4010 is our newest field service diagnostic instrument with a rugged, compact design and powerful internal memory (2Gb micro SD card), 5 channel input for multiple diagnosis, optional 5 CAN BUS channels, 1ms scanning rate and is supplied with HYDROcom6 full software making it the instrument of choice for all mobile engineers as well as R&D.

Great variety

USB, digital I/O & optional CAN/RS232 interfaces.

Five channels

Three or four analogue and one or two frequency channel inputs (using a freely selectable analogue or frequency channel)

Great usability

Easy to use ergonomic keypad & interface.

Clear display

Large, easy to read colour display.

Ordering Information

	Power pack with adaptors	USB cable 2.0 m	Data CD	Minimess® 1620 direct connector	Pressure sensor PR 100 (HT-PD)	Temperature sensor TE 100	Measuring turbine QT 100 (RE4)	Measuring cable, 5.0 m	Transport case, plastic	
MultiSystem 4010	✓	✓	✓	x	x	x	x	x	x	3160-00-75.00
MultiSystem 4010 with CAN	✓	✓	✓	x	x	x	x	x	x	3160-00-75.10
4010 pressure measuring kit	✓	✓	✓	2x	2x	x	x	2x	✓	4010-pp-xx[1]-xx[1]
4010 pressure & temperature measuring kit	✓	✓	✓	2x	2x	✓	x	3x	✓	4010-ppT-xx[1]-xx[1]
4010 pressure, temperature & flow measuring kit	✓	✓	✓	2x	2x	✓	✓	4x	✓	4010-ppTQ-xx[1]-xx[1]-yy[2]

1: xx is the measuring range code, see order data pressure sensor HySense© PR 100
2: yy is the measuring range code, see order data volume flow rate sensor HySense© QT 100

- Up to four analogue measuring inputs for mA or V signals
- Up to two frequency input to max. 10 kHz
- Additionally 5 virtual calculation or CAN channels
- Colour display
- 2Gb memory
- Measuring rate 1ms
- Robust plastic housing

MultiSystem 4010

Technical Data

Channels

Analogue channels	4* (0/4 ... 20mA, 0...5/10V or Hydrotechnik ISDS)
measuring rate	1 kHz
error limit	± 0.2% FS
electrical connection	6-pole jack, compatible to DIN 45 322, IEC 60130-9
Frequency channels	2* (Standard or Hydrotechnik ISDS)
signals	1 Hz ... 10 kHz
measuring rate	~18 ms
error limit	± 0.2% of measured value
electrical connection	6-pole jack, compatible to DIN 45 322, IEC 60130-9
Virtual channels	5 (difference, sum, hydraulic power or optional CAN)

* 1 channel is selectable between analogue or frequency

Memory values

Type	2Gb micro SD RAM card
Max. number of measuring series	100
Max. number of values per series	2 million
Recording rate	1 ms ... 10 min
Recording time (at recording rate 10 ms)	1 s ... 999 h
Number of triggers	1
Pretrigger	0 ... 100%

PC software options

Firmware update	HYDROboot	✓	8874-14-11.01
Execute online measurements	HYDROcom	✓[1]	8874-13-01.02
Download measurement data			
Evaluate and present measurement data			

1: HYDROcom full (standard)

Accessories

Power pack	110/240 VAC, 50/60 Hz – 24 VDC/630 mA	8812-20-02.00
Table-top power pack	100/240 VAC, 50/60 Hz – 24 VDC/630 mA	8812-02-01.00
Power cord USA	... for table-top power pack, cord length 2.0 m	8824-G6-02.00
Car power supply	12 VDC – 24 VDC; cable length 5.0 m	8824-64-05.00
Transport case	Plastic, black, with measuring turbine box	3160-00-70.01
	Aluminium, red, without measuring turbine box	3160-00-70.02
	Aluminium, red, with measuring turbine box	3160-00-70.03
Protective bag	Nylon, black, front transparent film	8875-01-05.00
USB cable	Mini Plug USB-A/-B; highspeed USB 2.0; 2.0 m	8824-R4-02.00

Additional accessories (cables, Minimess© products, a.s.o.) in the section "Accessories"

MultiSystem 5060

The mobile all rounder instrument of choice for industry professionals

The 5060 is the most advanced hand held data logger made by Hydrotechnik. Using the latest technology it is the benchmark for mobile hydraulic diagnostic measurement and logging. The unit has eight channels, 14 CAN Bus channels, 2Gb of internal memory, 0.1mS scanning rate, hi-res colour screen, graph, text, pictorial outputs, sleek design and much much more making it the must have instrument and choice for all hydraulic professionals. The 5060 has established itself as a standard for component manufacturers as well as OEM research & development or end of line testing.

Connectivity

frequency input (e.g. volume flow rate, rotational speed)
Analog input signal (e.g. pressure, temperature)
Highspeed sensors with an analog signal (e.g. for pressure peaks)
USB host device (e.g. printer)
USB device interface (e.g. PC connection, USB stick)
Multi-functional interface (e.g. CAN bus, RS 232)
Digital I/O interface (e.g. external trigger)
Power supply jack (e.g. power pack, car power adaptor)

Ordering Information

	Power pack with adaptors	USBcable 2.0 m	Data CD	Minimess® 1620 direct connector	Pressure sensor PR 100	Temperature sensor TE 100	Measuring turbine QT 100	Measuring cable, 5.0 m	Transport case, plastic	
MultiHandy 5060	✓	✓	✓	x	x	x	x	x	x	3160-00-70.00
5060 pressure measuring kit	✓	✓	✓	2x	2x	x	x	2x	✓	5060-pp-xx[1]-xx[1]
5060 pressure & temperature measuring kit	✓	✓	✓	2x	2x	✓	x	3x	✓	5060-ppT-xx[1]-xx[1]
5060 pressure, temperature & flow measuring kit	✓	✓	✓	2x	2x	✓	✓	4x	✓	5060-ppTQ-xx[1]-xx[1]-yy[2]

1: xx is measuring range code, see order data pressure sensor HySense© PR 1xx
2: yy is measuring range code, see order data volume flow rate sensor HySense© QT 1xx

- Six analogue measuring inputs for 0 to 20 mA, 4 to 20 mA, 0 to 10 V, 0.5 to 4.5 V, ±10 Vw
- Two frequency inputs to max. 10 kHz
- Trigger input and output
- 14 CAN bus signal inputs
- 13 bit Analog/Digital-converter
- Calculated channels with fixed or freely definable formulas
- 3.5” colour display with full graphical abilities and 4.096 colours (320 x 240 pixel)
- 2 GB measurement value memory (SD card)
- 200 measurement series with the total of two million values per measurement
- Measuring rate down to 0.1 ms
- Menu controlled operation
- Light plastic housing
- Data transmission with USB interface (device and host interface)
- Hardware and software filter
- CAN database to store the parameters of CAN sensors
- Sensor database to store sensor parameters
- PASS function for the execution of automated measuring tasks
- Project management for the storing of max. 20 instrument configurations
- Help function
- Mains power pack and USB data cable included as part of delivery
- Also available as Measuring Kit in a case. See sensor section for suitable sensors for your kit needs.

MultiSystem 5060

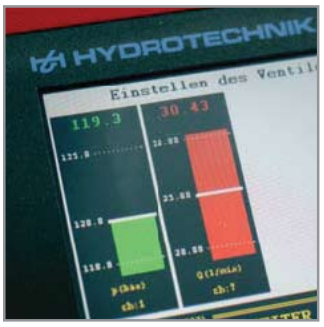
Open system architecture

Multiple input signals possible from analogue, Digital, Frequency and CAN.

Full CAN bus functionality

Display and record signals from CAN bus systems (e.g. CANopen, J1939) on up to 14 channels.

Independent data logger



Mobile test bench for serial testing or for troubleshooting complex systems.

14 special channels

Virtual calculation channels allow for increased variable measurement as well as CAN buses or Multimeters

Colour display with graphical abilities

Perfect display of graphical elements (e.g. diagrams, images) with freely selectable colours.

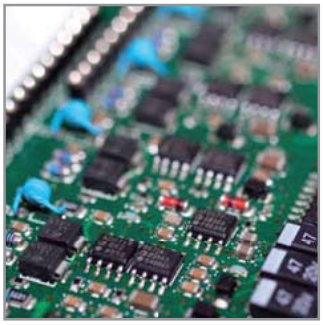
Networkability

Measuring system with 48 channels: Full performance and synchronised data for easy evaluation on PC.

USB stick for data exchange

Easy transfer of measuring data or device configurations between measuring systems and PCs.

Unique hardware filter



Processing and smoothing of measuring data in real time.

Technical Data

Channels

Analogue channels standard signals	6 (0/4 ... 20mA, 0 ... 10 V, ±10 V, 0.5 ... 4.5 V, 1 ... 5 V, 2 ... 10 V with Hydrotechnik ISDS)
measuring rate	10 kHz
error limit	± 0.15% FS
Measuring channels frequency	2 (with Hydrotechnik ISDS and direction detection)
signals	0.25 Hz ... 20 kHz (w.o.d.d.), 0.25 Hz ... 5 kHz (w.d.d.)
measuring rate	10 ms
error limit	± 0.2% of measured value
electrical connection	6-pole jack, compatible to DIN 45 322, IEC 60130-9

Further channels

Digital input channels	1, galvanically separated
signals	3.5 ... 30 VDC (high)
Digital output channels	1
signals	NPN transistor output, max. 30 VDC / 10 mA
Special channels	14 (for CAN, MultiXtend or calculations)
MultiMeter connector	RS 232
CAN measuring rate / protocols	10 ms / CANopen, SAE J1939, a.o.
Calculations	Difference, sum, 1. derivation, hydraulic power, freely definable formulas

MultiSystem 5060

Technical Data (continued)

Memory values

Type	SD card 2 GB
Max. number of measuring series	200
Max. number of values per series	200 million
Recording rate	0.1 ms ... 999 min
Individual scan rate	2 selectable, factor 1 ... 5,000
Recording time	1 s ... 999 h (in steps)
Number of triggers	2, linkable
Pretrigger	0 /10 /20 ... 100%

Equipment and features

Display	3.5“ color TFT, QVGA
Interface	USB 2.0/FS device/host, RS232, CAN
Power supply	Power pack (24 VDC / 340 mA), Batteries (NiMH / 14.4 V / 1,100 mAh)
Batteries	NiMH 14.4 V / 2,150 mAh
Battery performance[1]	8 h
Sensor power supply	> 13 V (battery operation) / 18 V (power pack operation)
CAN power supply	~13 VDC / 80 mA (batteries), ~ 20 VDC / 80 mA (power pack)
USB host power supply	~ 5 VDC / 75 mA
Casing (L x W x H) / Weight	ABS plastics (~ 240 x 130 x 60 mm) / ~ 1.1 kg
Protection type	IP 40
Operation / storage temperature	-10 ... 50 °C / -20 ... +50 °C

PC software options

Firmware update	HYDROboot	✓	8874-00-06.01
Instrument remote configuration	HYDROlink	✓	8874-00-07.01
Instrument remote operation			
Execute online measurements	HYDROcom	✓[1]	8874-13-01.02
Download measurement data			
Evaluate and present measurement data			
Execute measurement procedures	HYDROrun	✓[2][3]	8874-01-01.55

1: 3 licenses HYDROcom Standard
2: only for procedures in the instrument; PC software not contained
3: a license code is required to load new procedures into the instrument

Accessories

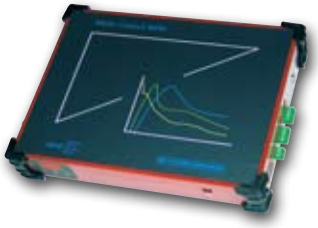
Power pack	110/240 VAC, 50/60 Hz – 24 VDC/630 mA	8812-20-02.00
Table-top power pack	110/240 VAC, 50/60 Hz – 24 VDC/630 mA	8812-02-01.00
Car power supply	12 VDC – 24 VDC; cable length 5.0 m	8824-64-05.00
Battery pack	NiMH, 2,150 mAh	8873-07-01.00
USB cable	Plug USB-A/-B; highspeed USB 2.0; 2.0 m	8824-F4-02.00
Connection cable	Parallel link 2x MS 5060	8824-F2-00.50
	External trigger, open cable ends	8824-D8-01.00
	Trigger cable for impulse counting	8824-R3-00.35
Transport case	Plastic, black, with space for turbines	3160-00-70.01
	Aluminium, red, without space for turbines	3160-00-70.02
	Aluminium, red, with space for turbines	3160-00-70.03
Protective bag	Nylon, black, front transparent film	8875-01-07.00

MultiSystem 8050

The stand alone solution for complex measurement & control

This is our largest single measuring unit with up to 40 channels. All measured values are displayed on a large touch screen display, numerically or graphically . The 8050 is unique in its flexibility with multiple integrated inputs and outputs. The units are even more powerful when used with HYDROgen test software in addition to the excellent HYDROcom 6 that comes with each unit.

The 8050 can be integrated into existing test environments due to the various connection possibilities and interfaces including CANbus measuring capability.



MultiControl 8050

If you have a PC available as part of your test environment, a version without display is an economic option with identical performance to the MultiSystem 8050. Connect the MultiControl via USB to your PC, operation is done in an easy and comfortable way using the software package HYDROlink delivered with the instrument.

At a glance

Up to 30 channels can be displayed simultaneously on a high resolution TFT display.

Great variety

Ready for all duties with the total of 32 analog, frequency and digital inputs and outputs.

Predefined measuring programs

Measuring programs created with HYDROgen ensure faultless simple testing for use by any level of operator.

Very open

A great number of interfaces and connection possibilities ease the integration into existing environments.

More possibilities

Independent inputs for the direct measuring of current and voltage.

Peak performance

Two high speed inputs to measure analogue signals with a scan rate of up to 0.1 ms.

Always in the picture

An additional LED indicator gives information on the status of the instrument.

Easy operation

The operation software requires little training to understand configuration and daily operation.

MultSystem 8050

Technical Data

Measuring channels

Analogue channels standard signals	10 (with Hydrotechnik ISDS)	
signals	0...20mA, 4...20mA, 0 ... 10V, ±10V	
A/D converter	16 bit	
measuring rate	1 kHz (channels 1 ... 8), 10 kHz (channels 9 + 10)	
error limit	± 0.1% FS	
electrical connection	6-pole yesck, compatible to DIN 45 322, IEC 60130-9	
Analog channels current/voltage	1 x current measuring	1x voltage measuring
signal	± 2 ADC	± 48 VDC
A/D-converter	12 bit	
measuring rate	1 kHz	
error limit	< 1% FS	
Measuring channels frequency	4 (with Hydrotechnik ISDS and direction detection)	
signals	0.05 Hz ... 20 kHz (w/o.d.d.), 0.05 Hz ... 5 kHz (w.d.d.)	
measuring rate	~10 ms	
error limit	± 0.2% of measured value	
electrical connection	6-pole connection, compatible to DIN 45 322, IEC 60130-9	

Further channels

Digital input channels	4, 1 separated galvanically
signal	3.5 ... 30 VDC (high)
Digital output channels	4
signal	NPN transistor output, max. 30 VDC / 10 mA
Analog output channels	2
signal	0 ... 20 mA (channel 25); ± 20 mA (channel 26)
D/A-converter	12 bit
Special channels	6, optional 14 (for CAN or calculations)
CAN measuring rate	10 ms
CAN protocols	CANopen, SAE J1939, a.o.
Calculations	Difference, sum, 1. derivation, hydraulic power, free definable formulas

Memory values

Type	CF-card 256 MB
Max. number of measuring series	200
Max. number of values per series	6 million
Recording rate	0.1 ms ... 999 min
Recording time	1 s ... 999 h (in steps)
Number of triggers	2 (optional 6), linkable
Pretrigger	0 /10 /20 ... 100%

MultiSystem 8050

Equipment and features

Display	10.4“ color-TFT, VGA (MultiSystem 8050)
Interfaces	USB 1.1 / FS device, RS232, Centronics, CAN, LVDS
Power supply	Power pack (24 VDC / 2 A)
Sensor power supply	18 V / 100 mA
Casing	Steel sheets with impact protections
Dimensions (L x W x H)	~ 310 x 254 x 60 mm
Weight	~ 3.1 kg (MultiSystem 8050)
Protection type	IP 40
Operation temperature	0 ... 40 °C (MultiSystem 8050), 0 ... 60 °C (MultiControl 8050)
Storage temperature / relative humidity	-20 ... +60 °C / 0 ... 80% r.H. (not condensing)

Ordering Information

	Power pack with adaptors	USBcable 2.0 m	Data CD	
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

Versions with 14 CAN channels on request

PC software options

Firmware update	HYDROboot	✓	8874-00-06.01
Instrument remote configuration	HYDROlink	✓	8874-00-07.01
Instrument remote operation			
Execute online measurements	HYDROcom	✓[1]	8874-13-01.02
Download measurement data			
Evaluate and present measurement data			
Program measurement procedures	HYDROgen	✓	8874-01-01.55
Execute measurement procedures	HYDROrun	✓[2][3]	8874-01-01.55

1: 3 licenses HYDROcom Standard
2: only for procedures in the instrument; PC software not contained
3: a license code is required to load new procedures into the instrument

Accessories

Table-top power pack	110/240 VAC, 50/60 Hz – 24 VDC/630 mA	8812-00-00.27
Car power supply	12 VDC – 24 VDC; cable length 5.0 m	8824-79-05.00
Connection cables	Linkage of two MS/MC 8050	8824-F2-00.50
	PC connection for firmware update	8824-F8-01.50
Protection bag	Nylon, black, front transparent film	8875-01-06.00
Transportation box	Aluminium, red	3160-00-65.03

HYDROcom 6 Analysis Software

The new standard for measurement data analysis

HYDROcom 6 is the powerful analysis software provided with all Hydrotechnik datalogging instruments. Improvements have been made to useability with intuitive Windows explorer style menus and easy drag and drop operation. Analysis, editing and file management is made easy in a user friendly environment making test evaluation and reporting simpler and more powerful than ever before.

- Windows explorer based file viewer
- Transfer, import, export measuring data
- Drag & drop measurement files
- Evaluate, edit, present measurements
- Line diagrams, tables, histograms, ...
- Execute online measurements
- Create reports and test protocols
- Modern, user-friendly program surface
- Overlay tests on top of each other for comparison analysis

HYDROcom 6 comes in 3 versions

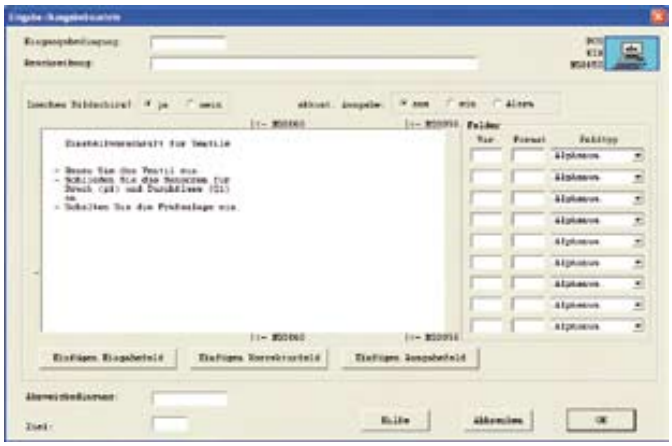
Version comparison	Basic	Full	Professional
HYDROcom Explorer	✓	✓	✓
Search function	x	x	✓
Save presentation	x	✓	✓
Viewer: number of layout sections	1	6	24
Line diagram: number of channels	12	12	24
Format / smooth / move / use elements	x	✓	✓
Spot / difference spot	x	✓	✓
Difference measuring lines / classifications	x	x	✓
Histogram: number of bars	x	4	8
Table: number of columns	3	13	25
Texts / pictures	x	✓	✓
Configuration files	x	✓	✓
Connect instrument / transfer measurements / online measuring	✓	✓	✓
Online measuring: analog (gauge style) / bargraph / mini-app	x	x	✓
Device information / device list	x	✓	✓
Data exchange in txt- / csv-format	x	✓	✓
Data exchange in xml-format	x	x	✓
Software module, Report‘	x	x	✓

Options & Ordering Information

HYDROcom 6 Professional (3 licenses)	8874-19-01.01
HYDROcom 6 Full (3 licenses)	8874-19-01.02
HYDROcom 6 Basic	8874-19-01.03
Upgrade HYDROcom 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

HYDROgen & HYDROrun Operator Software

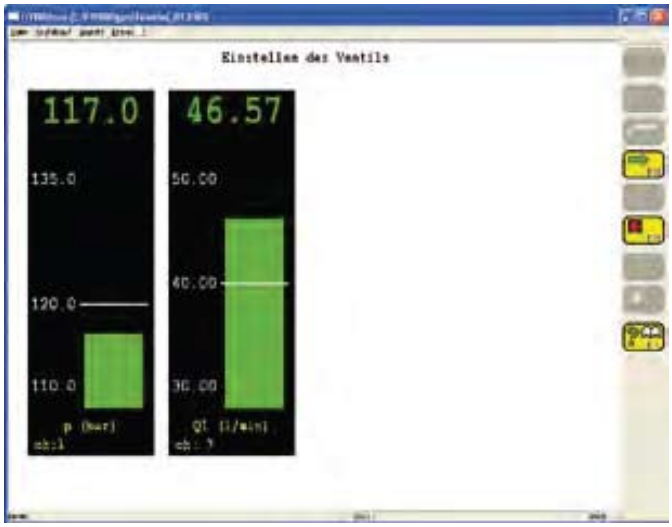
HYRDOgen & HYDROrun is a software program that can be integrated into 5060 or 8050 units allowing for bespoke test programs to be written according to customer requirements. Test steps can be written allowing for graphical representation of medium or component test procedures with pass/go or failure protocols allowing fast and error free testing for operators or engineers.



HYDROgen

- Compose measuring and test sequences
- Standardise measuring tasks
- Map test specifications and norms
- Evidential documentation of measurements
- Executable via instrument or via PC
- Low training requirement

Single user license	8874-01-01.55
Compatible with	MultiSystem 8050
	MultiControl 8050
	MultiSystem 5060



HYDROrun

- Execution of HYDROgen test sequences
- Self-explanatory program surface
- Compatible with many operation systems

Single user license	contained in HYDROgen
Compatible with	MultiSystem 8050
	MultiControl 8050
	MultiSystem 5060

HYDROlink & HYDROboot Communication Software

HYDROlink

HYDROlink is a software program which allows 2 way communication between 5060 or 8050 instrument. Settings for your instrument can be changed remotely from your PC and PC display can be configured to show all active channel readings for remote display in a test room or office.

- Remotely connect and control measuring systems
- Full instrument functionality all via your PC
- Large Online measurements display
- For all MultiSystem / MultiControl instruments
- Easy operation
- Clearly arranged user interface

Options & Ordering Information

Single user license	8874-01-01.55
Compatible with	MultiSystem 8050
	MultiControl 8050
	MultiPanel 8050
	MultiSystem 5060

HYDROboot

HYDROboot is a freely downloadable software program which allows you to upgrade the firmware (if necessary) of your Multihandy or Multisystem devices.

- Firmware update software for your instrument
- Displays your current firmware version
- Compatible with USB and serial interfaces
- Data transfer via network
- Free download from www.hydrotechnik.com

Options & Ordering Information

Single user license	8874-00-06.01
Compatible with	MultiHandy 302x
	MultiHandy 3050
	MultiBox 306x
	MultiControl 8050
	MultiSystem 8050
	MultiSystem 5060
Firmware update for MultiHandy 2020	on request

Introduction

The following section offers a massive choice of equipment for extending measurement capabilities of your chosen measuring system, kit or equipment. Many of the sensors are designed as stand alone equipment for OEM design or end user requirements.

HySense®

The new name for our family of measurement sensors. The HySense® range includes a wide range of pressure & temperature sensors, flow turbines & circular gear flowmeters, RPM infra-red & inductive sensors as well as a new family of position, vibration, torque and force sensors

ISDS
Intelligent Sensor Detection System

Hydrotechnik offer a vast range of sensors with most signal output requirements catered for. Many of our sensors also have ISDS functionality for use with Hydrotechnik test equipment. ISDS is the automatic transmission of parameters and calibration data from the Hydrotechnik sensor to the measuring instrument. This helps save time, elimate potential user error and improves accuracy (due to the multiple calibration points stored within the sensor EPROM) providing auto linearisation.

MultiXtend

MultiXtend is the name of the extension boxes for Hydrotechnik MultiHandy & MultiSystem measuring instruments. Use them to increase the number of analogue or frequency inputs, measure new signals, or convert existing signals. MultiXtend CAN signal adaptor boxes enable addition of further channels on Multisystem instruments.

MultiXtend Analogue / Thermo

MultiXtend is the name of the extension boxes for Hydrotechnik MultiHandy & MultiSystem measuring instruments. Use them to increase the number of analogue or frequency inputs, measure new signals, or convert existing signals.

MultiXtend Analogue

4 extra analogue input channels 0 or 4 ... 20 mA

Connect four more analogue sensors of any measurand. The measuring data will be transferred to the measuring system via CAN bus on your MultiSystem 5060 or 8050.

Input signal	0/4 ... 20 mA
Resolution	16 bit
Scan rate (each channel)	200 Hz
Measuring error	0.01 % of EV
Operation temperature	–40 ... +85 °C
Storage temperature	–40 ... +85 °C
Protection type	IP 65 (plugged)
Casing	Aluminium die-cast
Dimensions (L x W x D)	125 x 57 x 80 mm

MultiXtend Analogue or Thermo boxes can be connected in series adding further channels to MultiSystem 5060 or 8050 test systems.
Further technical information on request.

Options & Ordering Information

4x analog (0 ... 20 mA)	3160-00-00.72A0
4x analog (4 ... 20 mA)	3160-00-00.72A4
Sensor cable (5.0 m)[1]	8824-S1-05.00Y
MS 8050 cable (1.0 m)	8824-N1-01.00
MS 5060 cable (1.0 m)	8824-M5-01.00

1: other cable lengths available

MultiXtend Thermo

4 thermal elements or sensors Pt 100

Four temperature signals are converted into CAN data and transferred to your MultiSystem 5060 or 8050.

Input signal	Pt100 / J Type / K Type
Measuring Range Pt100	-100...+850°C
Measuring Range Type J / K	-200...+1200°C
Resolution	16 bit
Scan rate (each channel)	100 Hz
Measuring error	0.01 % of EV
Operation temperature	–40 ... +85 °C
Storage temperature	–40 ... +85 °C
Protection type	IP 65 (plugged)
Casing	Aluminium die-cast
Dimensions (L x W x D)	125 x 57 x 80 mm

1: other cable lengths available.

Options & Ordering Information

4x thermal element type J	3160-00-00.73J
4x thermal element type J Mini[1]	3160-00-00.73JB
4x thermal element type K	3160-00-00.73K
4x thermal element type K Mini[1]	3160-00-00.73KB
4x Pt 100	3160-00-00.73PT
MS 8050 cable (1.0 m)	8824-N1-01.00
MS 5060 cable (1.0 m)	8824-M5-01.00

MultiXtend F, UI, Split

MultiXtend F

1 extra frequency input

The measuring data of a sensor with frequency output are transmitted to the MultiSystem via CAN bus.

Input signal	Frequency (square wave)
Resolution	16 bit
Scan rate	100 Hz
Operation temperature	–20 ... +80 °C
Storage temperature	–20 ... +80 °C
Dimensions (L x W x D)	125 x 57 x 80 mm

Options & Ordering Information

1x frequency (square wave signal)	3160-00-00.51
MS 8050 cable (3.0 m)	8824-F8-03.00

MultiXtend UI

1 input for voltage or current measurement

Galvanically separated inputs to measure voltage or current. With switchable PWM filter and available in two versions.

Version	low resistive	high resistive
Meas. range voltage	±60 VDC	± 30 VDC
Meas. rang current	± 4 ADC	± 2 ADC
Input resistor	1 kΩ/V	10 kΩ/V
Supply voltage	13 ... 30 VDC	
Supply current	40 mA (without signal)	
Measuring error	< ± 1% of final value	
Output signal	0 ... 20 mA	
Zero value	at output signal 10 mA	

Options & Ordering Information

High resistive, meas. range 2A / 30V	3160-00-00.80
Low resistive, meas. range 4A / 60V	3160-00-00.81
Extension cord MK01 (5.0 m)	8824-26-05.00

MultiXtend Split

1 analogue input split in to 2 separate analogue outputs.

Galvanically separated signal splitter (potential free and non-reactive) to connect one sensor to two recipients. e.g an output for a fixed display and Datalogger simultaneously from one sensor.

Input signal	0/4 ... 20 mA
Connection voltage	12 ... 30 V DC
Current cons. (without signal) OUT2	30 mA
Linearity error[1]	± 0.3 % FS
Warm-up time	5 Min
Operation temperature	–40 ... +85 °C
Storage temperature	–40 ... +85 °C
Dimensions (L x W x D)	125 x 57 x 80 mm

1: @ 23 °C, loop resistance 10 Ω

Options & Ordering Information

MultiXtend Split	3160-00-00.84
Extension cord MK01 (5.0 m)	8824-26-05.00

MultiXtend Trigger / MultiMeter

MultiXtend Trigger

1 trigger input – 4 trigger outputs

A trigger box for operating in series up to 4 MultiSystem 5060 units simultaneously.

Signal	HT-specific trigger signal
Supply voltage	9 ... 36 VDC
Operation / storage temperature	-40 ... +85 °C
Protection type	IP 40
Dimensions (L x W x D)	125 x 57 x 80 mm

MultiXtend Trigger	3160-00-00.45
Cable Master – MXTrigger	8824-R3-00.35
Cable MXTrigger – slave; 0.5 m	8824-F2-00.50

MultiXtend Thermocouple measuring converter

An adaptor box to convert 1 x Type J or Type K thermocouple measurement in to a 0...20mA analogue output for Hydrotechnik measuring instruments.

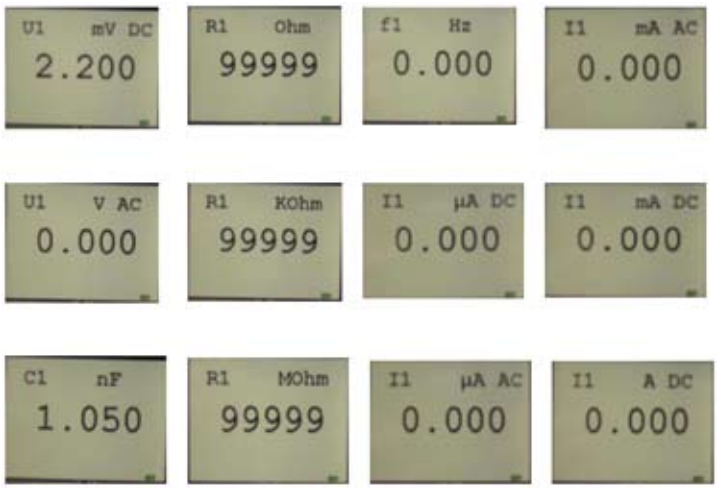
Description	Measuring instrument	Part number
For Ni-Cr-Ni thermal element 0 to 1000°C, type K	All Hydrotechnik	3160-00-00.47
For Fe-Cu-Ni thermal element 0 to 500°C, type J	All Hydrotechnik	3160-00-00.50

MultiXtend MultiMeter

Voltcraft VC 900 series Digital Multimeters

Measure multiple Multi meter electrical information such as voltage, current, frequency, capacitance, resistance etc. to your MultiSystem 5060 through the CAN bus connection. These units are specially designed to work with the 5060

Further technical details on request.



Multiple meter data is transferred to the 5060 using CAN bus & 1 simple cable.

Options & Ordering Information

Voltcraft VC 920[1]	8877-00-04.00
Voltcraft VC 940[1]	8877-00-05.00
Voltcraft VC 960[1]	8877-00-06.00
Conn. cable MS 5060 (2.0 m)	8824-N9-02.00

1: incl. connection cable for MS 5060 (2.0 m)

HySense PR100 Mobile Pressure Sensor

PR100 (formerly known as HT-PD)

The HySense PR100 (formerly known as HT-PD) is our most popular pressure sensor for mobile applications. Also popular in stationary industrial applications, it is available from -1 up to 4000 bar and comes with a 5 or 6(ISDS) psi connection for quick secure connection and disconnection.

- Our most popular test sensor
- Designed for mobile use
- For all Hydrotechnik measuring instruments
- Short response time
- High-pressure version up to 4,000 bar on request

The PR126 pressure sensor is now available on request with CANopen signal output for integration in to your existing CAN line opening up further measuring possibilities.

Features

Measuring principle	piezo-resistive (poly-cristalline silicon thin film structure on high-grade steel membrane)
Pressure type	relative pressure
Output signal	0 ... 20 mA (ISDS) or 4 ... 20 mA
Electrical meas. connector	6 pole device connector, M16 x 0.75
Mechanical connection	ISO 228 – G ¼ A
Sealing material	profile seal ring acc. to DIN 3869, FKM
Protection type (EN 60529 / IEC 529)	IP 67 (plugged)
Material casing / membrane	non-corrosive high-grade steel
Weight	~ 85 g

Technical data

Overload range	1.5 times nominal pressure
Burst pressure	3 times nominal pressure
Mounting orientation	arbitrary
Supply voltage Ub	10 ... 30 VDC
Current consumption	6.5 mA
Over-voltage protection	32 VDC
Response time	≤ 1 ms (10 ... 90 %)
Error limit (of fi nal value)1	≤ ± 0.25 % (with ISDS, linearised) / ≤ ± 0.5 % (without ISDS)
Medium temperature	-40 ... +125 °C
Environmental temperature	-40 ... +105 °C
Storage temperature	-40 ... +125 °C

Options & Ordering Information

Suited for	Measuring range		ISDS 0..20mA output	standard 4-20mA output
all measuring instruments, except MultiHandy 2020	-1 ... 6 bar	-0.1 ... 0.6 MPa	3403-32-S-E5.33	3403-32-C3.37
	0 ... 60 bar	0 ... 6.0 MPa	3403-21-S-E5.33	3403-21-C3.37
	0 ... 200 bar	0 ... 20 MPa	3403-10-S-E5.33	3403-10-C3.37
	0 ... 400 bar	0 ... 40 MPa	3403-15-S-E5.33	3403-15-C3.37
	0 ... 600 bar	0 ... 60 MPa	3403-18-S-E5.33	3403-18-C3.37
	0 ... 1000 bar	0 ... 100 MPa	3403-29-S-E5.33	3403-29-C3.37
MultiHandy 2020	-1 ... 6 bar	-0.1 ... 0.6 MPa	3403-32-S-N4.37	-
	0 ... 60 bar	0 ... 6.0 MPa	3403-21-S-N4.37	-
	0 ... 200 bar	0 ... 20 MPa	3403-10-S-N4.37	-
	0 ... 400 bar	0 ... 40 MPa	3403-15-S-N4.37	-
	0 ... 600 bar	0 ... 60 MPa	3403-18-S-N4.37	-

HySense PR300 Mobile Pressure Sensor

The Hysense PR300 (formally known as PR15) is a popular alternative to our PR100 sensor due to the heavy duty design and high accuracy, giving this sensor long life in harsh, demanding conditions.

- Fast, highly accurate sensor
- Very good noise qualities
- Ideal for Hydrotechnik measuring instruments
- Short response time
- Many pressure ranges
- Formerly known as PR15

Features

Measuring principle	piezo-resistive (silicon chip embedded in transmission fluid contained in high-grade steel casing)
Pressure type	relative pressure
Output signal	0 ... 20 mA
Electrical meas. connector	6 pole device connector, M16 x 0.75
Mechanical meas. connector	ISO 228 – G ¼ internal thread
Protection type (EN 60529 / IEC 529)	IP 40
Material casing	1.4104, 1.4301
Material membrane	1.4435
Weight	~ 120 g

Technical data

Overload range	1.5 times nominal pressure
Burst pressure	2.5 times nominal pressure
Mounting orientation	arbitrary
Supply voltage Ub	6.5 ... 30 VDC
Current consumption	<10 mA
Over-voltage protection	36 VDC
Response time	1 ms (10 ... 90 %)
Error limit (of final value)	≤ ± 0.25 % (with ISDS, linearised) / ≤ ± 0.25 % (without ISDS)
Medium temperature	-20 ... +80 °C
Environmental temperature	-20 ... +80 °C
Storage temperature	-20 ... +85 °C

Options & Ordering Information

Measuring range		with ISDS	without ISDS
-1 ... 6 bar	-0.1 ... 0.6 MPa	3403-32-S-71.33A	3403-32-71.33A
0 ... 60 bar	0 ... 6.0 MPa	3403-21-S-71.33A	3403-21-71.33A
0 ... 200 bar	0 ... 20 MPa	3403-10-S-71.33A	3403-10-71.33A
0 ... 400 bar	0 ... 40 MPa	3403-15-S-71.33A	3403-15-71.33A
0 ... 600 bar	0 ... 60 MPa	3403-18-S-71.33A	3403-18-71.33A
0 ... 1000 bar	0 ... 100 MPa	3403-29-S-71-33.A	3403-29-71.33A

HySense PR130 industrial pressure sensor

Industrial pressure sensor with 4 pole M12 x1 electrical connection.

PR130 (formerly known as HT-PD)

The HySense PR130 pressure sensor (formally part of the HT-PD family) is a sensor designed for OEM systems and industrial applications. The popular M12 x 1 connection thread, wide range of pressure ranges and output signals make this a popular choice in conjunction with the low cost, good availability and renowned Hydrotechnik quality.

Technical Information

Measuring principle	piezo-resistive (poly-cristalline silicon thin film structure on high-grade steel membrane)
Pressure type	relative pressure
Output signal	4 ... 20 mA / 0 ... 10 VDC
Electrical measuring connector	4 pole device connector, M12 x 1
Mechanical connection thread	ISO 228 – G ¼ A
Sealing material	profile seal ring acc. to DIN 3869, FKM
Protection type (EN 60529 / IEC 529)	IP 67 (when connector is screwed)
Casing material	non-corrosive high-grade steel
Membrane material	non-corrosive high-grade steel
Tightening torque	40 Nm (± 5 Nm)
Weight	~ 85 g

Wiring Information

Pin assignment	Pin	4 ... 20 mA (two wire)	0 ... 10 V (three wire)
	1	– Ub / signal –	Signal +
	2	free	– Ub / signal – / GND
	3	+ Ub / signal +	free
	4	free	+ Ub

Options & Ordering Information

Measuring range		Order number	
bar	MPa	4 ... 20 mA	0 ... 10 V
-1 ... 6	-0.1 ... 0.6	3403-32-I5.37	3403-32-I5.39
0 ... 10	0 ... 1.0	3403-26-I5.37	3403-26-I5.39
0 ... 25	0 ... 2.5	3403-40-I5.37	3403-40-I5.39
0 ... 60	0 ... 6.0	3403-21-I5.37	3403-21-I5.39
0 ... 100	0 ... 10	3403-16-I5.37	3403-16-I5.39
0 ... 250	0 ... 25	3403-17-I5.37	3403-17-I5.39
0 ... 400	0 ... 40	3403-15-I5.37	3403-15-I5.39
0 ... 600	0 ... 60	3403-18-I5.37	3403-18-I5.39
0 ... 1000	0 ... 100	3403-29-I5.37	3403-29-I5.39

Further pressure ranges, signal outputs & connection types available on request

Further technical data on page 73

HySense PR140 industrial pressure sensor

Industrial pressure sensor with 4 pole DIN EN 175301-803 type A, Pg9 electrical connector

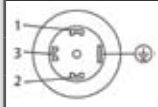
PR140 (formerly known as HT-PD)

The HySense PR140 (formerly part of the HT-PD family) is a sensor designed for OEM systems and industrial applications. The Hirschmann connections fits in with modern system design with a wide range of pressures. and output signals make this a popular choice in conjunction with a low cost, good availability and renowned Hydrotechnik quality.

Features

Measuring principle	piezo-resistive (poly-cristalline silicon thin film structure on high-grade steel membrane)
Pressure type	relative pressure
Output signal	4 ... 20 mA / 0 ... 10 VDC
Electrical measuring connector	4 pole device connector, DIN EN 175301-803, type A, Pg9
Mechanical connection thread	ISO 228 – G ¼ A
Sealing material	profile seal ring acc. to DIN 3869, FKM
Protection type (EN 60529 / IEC 529)	IP 65 (with connecting cable Ø 6 ... 8 mm)
Casing material	non-corrosive high-grade steel
Membrane material	non-corrosive high-grade steel
Tightening torque	40 Nm (± 5 Nm)
Weight	~ 117 g

Wiring Information

Pin assignment	Pin	4 ... 20 mA (two wire)	0 ... 10 V (three wire)
	1	+ Ub / signal +	+ Ub
	2	- Ub / signal -	– Ub / signal – / GND
	3	free	Signal +

Options & Ordering Information

Measuring range		Order number	
bar	MPa	4 ... 20 mA	0 ... 10 V
-1 ... 6	-0.1 ... 0.6	3403-32-D1.37	3403-32-D1.39
0 ... 10	0 ... 1.0	3403-26-D1.37	3403-26-D1.39
0 ... 25	0 ... 2.5	3403-40-D1.37	3403-40-D1.39
0 ... 60	0 ... 6.0	3403-21-D1.37	3403-21-D1.39
0 ... 100	0 ... 10	3403-16-D1.37	3403-16-D1.39
0 ... 250	0 ... 25	3403-17-D1.37	3403-17-D1.39
0 ... 400	0 ... 40	3403-15-D1.37	3403-15-D1.39
0 ... 600	0 ... 60	3403-18-D1.37	3403-18-D1.39
0 ... 1000	0 ... 100	3403-29-D1.37	3403-29-D1.39

Further pressure ranges, signal outputs & connection types available on request

Further technical data on page 73

HySense PR150 pressure sensor

Industrial pressure sensor with 4 pole DIN EN 175301-803 type C, Pg7 electrical connector

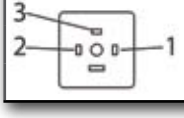
PR150 (formerly known as HT-PD)

The HySense PR150 (formerly part of the HT-PD family) is a sensor designed for OEM systems and industrial applications. The Mini Hirschmann connector is popular in compact or smaller systems.

Features

Measuring principle	piezo-resistive (poly-cristalline silicon thin film structure on high-grade steel membrane)
Pressure type	relative pressure
Output signal	4 ... 20 mA / 0 ... 10 VDC
Electrical measuring connector	4 pole device connector, DIN EN 175301-803, type C, Pg7
Mechanical connection thread	ISO 228 – G ¼ A
Sealing material	profile seal ring acc. to DIN 3869, FKM
Protection type (EN 60529 / IEC 529)	IP 65 (with connecting cable Ø 4,5 ... 6 mm)
Casing material	non-corrosive high-grade steel
Membrane material	non-corrosive high-grade steel
Tightening torque	40 Nm (± 5 Nm)
Weight	~ 97 g

Wiring Information

Pin assignment	Pin	4 ... 20 mA (two wire)	0 ... 10 V (three wire)
	1	+ Ub / signal +	+ Ub
	2	– Ub / signal –	– Ub / signal – / GND
	3	free	Signal +

Options & Ordering Information

Measuring range		Order number	
bar	MPa	4 ... 20 mA	0 ... 10 V
-1 ... 6	-0.1 ... 0.6	3403-32-D5.37	3403-32-D5.39
0 ... 10	0 ... 1.0	3403-26-D5.37	3403-26-D5.39
0 ... 25	0 ... 2.5	3403-40-D5.37	3403-40-D5.39
0 ... 60	0 ... 6.0	3403-21-D5.37	3403-21-D5.39
0 ... 100	0 ... 10	3403-16-D5.37	3403-16-D5.39
0 ... 250	0 ... 25	3403-17-D5.37	3403-17-D5.39
0 ... 400	0 ... 40	3403-15-D5.37	3403-15-D5.39
0 ... 600	0 ... 60	3403-18-D5.37	3403-18-D5.39
0 ... 1000	0 ... 100	3403-29-D5.37	3403-29-D5.39

Further pressure ranges, signal outputs & connection types available on request

HySense PR155 ATEX approved pressure sensor

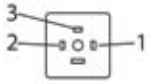
4 pole device connector, DIN EN 175301-803 type C, Pg7

The HySense PR155 is an ATEX approved version of our PR150 sensor for hazardous area pressure measurement.
Our standard version utilises a Mini Hirschmann connector but many other connectors are available on request.

Qualities

Measuring principle	piezo-resistive (poly-cristalline silicon thin film structure on high-grade steel membrane)
Pressure type	relative pressure
Output signal	4 ... 20 mA
Electrical measuring connector	4 pole device connector, DIN EN 175301-803, type C, Pg7
Mechanical connection thread	ISO 228 – G ¼ A
Sealing material	profile seal ring acc. to DIN 3869, FKM
Protection type (EN 60529 / IEC 529)	IP 65 (with connecting cable Ø 4.5 ... 6 mm)
Casing material	non-corrosive high-grade steel
Membrane material	non-corrosive high-grade steel
Tightening torque	40 Nm (± 5 Nm)
Weight	~ 100 g
Ex-approval	Ex II 2G
Explosion protection	EEx ia IIC T4
Approval number	IBExU 06 ATEX 1159

Wiring Information

Pin assignment	Pin	4 ... 20 mA (two wire)
	1	free
	2	- Ub / signal - / GND
	3	+ Ub / signal +

Options & Ordering Information

Measuring range		Order number
bar	MPa	4 ... 20 mA
-1 ... 1	-0.1 ... 0.1	3X03-20-03.37
0 ... 25	0 ... 2.5	3X03-40-03.37
0 ... 60	0 ... 6.0	3X03-21-03.37
0 ... 100	0 ... 10	3X03-16-03.37
0 ... 250	0 ... 25	3X03-17-03.37
0 ... 400	0 ... 40	3X03-15-03.37
0 ... 600	0 ... 60	3X03-18-03.37
0 ... 1.000	0 ... 100	3X03-29-03.37

Further pressure ranges, signal outputs & connection types available on request

Further technical data on page 73

HySense PR190 pressure sensor

Open cable ends, 4 wire

PR190 (formerly known as HT-PD)

The HySense PR190 (formerly part of the HT-PD family) is a pressure sensor designed for OEM systems or industrial use. The version comes supplied with a 1.5m moulded flying lead.

Qualities

Measuring principle	piezo-resistive (poly-cristalline silicon thin film structure on high-grade steel membrane)
Pressure type	relative pressure
Output signal	4 ... 20 mA / 0 ... 10 VDC
Electrical measuring connector	open ends, 4 wires, connection cable 1.5 m
Mechanical connection thread	ISO 228 – G ¼ A
Sealing material	profile seal ring acc. to DIN 3869, FKM
Protection type (EN 60529 / IEC 529)	IP 68 K
Casing material	non-corrosive high-grade steel
Membrane material	non-corrosive high-grade steel
Tightening torque	40 Nm (± 5 Nm)
Weight	~ 120 g

Wiring Information

Wire colour	4 ... 20 mA (two wires)	0 ... 10 V (three wires)
white	free	Signal +
black	– Ub / signal –	– Ub / signal – / GND
green	free	free
red	+ Ub / signal +	+ Ub

Options & Ordering Information

Measuring range		Order number	
bar	MPa	4 ... 20 mA	0 ... 10 V
-1 ... 6	-0.1 ... 0.6	3403-32-D6.37	3403-32-D6.39
0 ... 10	0 ... 1.0	3403-26-D6.37	3403-26-D6.39
0 ... 25	0 ... 2.5	3403-40-D6.37	3403-40-D6.39
0 ... 60	0 ... 6.0	3403-21-D6.37	3403-21-D6.39
0 ... 100	0 ... 10	3403-16-D6.37	3403-16-D6.39
0 ... 250	0 ... 25	3403-17-D6.37	3403-17-D6.39
0 ... 400	0 ... 40	3403-15-D6.37	3403-15-D6.39
0 ... 600	0 ... 60	3403-18-D6.37	3403-18-D6.39
0 ... 1000	0 ... 100	3403-29-D6.37	3403-29-D6.39

Further pressure ranges, signal outputs & connection types available on request

Further technical data on page 73

Technical Data for PR130, PR140, PR150, PR155 and PR190 pressure sensors

Further technical data shown here is valid for all sensors in the HySense® range below:-

- PR 130
- PR 140
- PR 150
- PR 155
- PR 190

Technical data	PR 130 / PR 140 / PR 150 / PR 190	PR 155
Overload range	1.5 x nominal pressure	
Burst pressure	3 x nominal pressure	
Signal type	Two wire analog (4 ... 20 mA), three wire analog (0 ... 10 VDC)	
Supply voltage Ub		
... at 4 ... 20 mA	10 ... 30 VDC	30 V
... at 0 ... 10 VDC	12 ... 32 VDC	-
Current consumption	6.5 mA	50 mA
Overvoltage protection	32 VDC	
Error limit (of final value)	comprises the influences non-linearity, hysterese, repeatability, zero-point- and span error	
... at +22 °C (room temperature)	± 0.5 %	
... at -15 ... +85°C	< ± 1.0 %	
... at +85 ... +100°C	< ± 2.5 %	
... at -40 ... -15°C	< ± 2.5 %	
Compensation temperature range	-40 ... +100 °C	
Non-linearity	< ± 0.4 % of final value	
Reproducability	< ± 0.1 % of final value	
Hysterese	< ± 0.1 % of final value	
Long-term stability	< ± 0.1 % of final value/year	
Response time	< = 1 ms (10 ... 90 %)	
Frequency range	< = 1 kHz	
Isolation resistance	min. 100 MOhm	
Total resistance	R_G = (Ub -10 V) / 20 mA (at output signal 4 ... 20 mA)	
Load resistance	R_L = > 5 kOhm (at output signal 0 ... 10 VDC)	
Number of load cycles	> 1 x 10^7	
Medium temperature	-40 ... +125 °C	
Environmental temperature	-40 ... +105 °C (short term +125 °C)	-40 ... +85 °C
Storage temperature	-40 ... +125 °C	
EMV test	EN 50081-2, EN 50082-2	
Vibrational stability	5 mm 10 ... 32 Hz, 20 g 32 ... 500 Hz, DIN EN 60068-2-6	
Shock stability	50 g (11 ms half-sine)	
Mounting orientation	arbitrary	

HySense TP 180 Dual Pressure & Temeperature Sensor

The HySense TP180 is a dual pressure & temperature sensor for mobile testing purposes. The sensor is designed to fit on to our 1620 p/T Minimess test points and gives two output signals for pressure & temperature via a splitter cable to suitable measuring device or displays.

- Simultaneous measuring of pressure + temperature
- Highly accurate through measurement in medium
- Arbitrary mounting orientation
- Ideal for Hydrotechnik measuring instruments
- Requires a Minimess® p/T test point

Features

	Pressure sensor	Temperature sensor
Measuring principle	piezo-resistive	Pt 1004
Pressure type	relative pressure	-
Output signal	4 ... 20 mA	
Electrical meas. connector	8 pole device connector, M16 x 0.75	
Mechanical meas. connector	Minimess® p/T test point 1620	
Protection type (EN 60529 / IEC 529)	IP 40	
Material casing	1.4571	
Material membrane	1.4435	
Weight	~ 255 g	

Technical data

	Pressure sensor	Temperature sensor
Overload range	1.5-fold nominal pressure	
Burst pressure	2.5 times nominal pressure	
Mounting orientation	arbitrary	
Supply voltage Ub	10 ... 30 VDC	
Current consumption	4 mA	
Over voltage protection	36 VDC	
Response time	≥ 1 ms	
Error limits (of final value)1	± 0.5 %	< ± 1 %
Medium temperature	-50 ... +200 °C	
Environmental temperature	-20 ... +80 °C	
Storage temperature	-20 ... +85 °C	

Options & Ordering Information

Pressure measuring range		Temperature measuring range	Order number
0 ... 6 bar	0 ... 6 MPa	-50 ... +200 °C	3763-04-34.00
0 ... 600 bar	0 ... 60 MPa	-50 ... +200 °C	3763-03-34.00

Please see page 87 for suitable measuring cables

HySense TE 101 Temperature Sensor

- Screw-in sensor
- Measures directly in the medium for accurate temperature measurements
- With ISDS ideal for mobile use
- Suited for all Hydrotechnik instruments
- Requires a Minimess® 1620 p/T test points

Features

Measuring principle	Pt 100 (platinum meas. resistor acc. to DIN 43760, class B)
Output signal	0 ... 20 mA ISDS or 4...20 mA
Electrical meas. connector	6 pole device connector, M16 x 0.75
Mechanical meas. connector	Minimess® 1620 p/T
Protection type (EN 60529 / IEC 529)	IP 67 (screwed connector)
Material casing	1.4104
Weight	~ 230 g

Technical data

Supply voltage Ub	10 ... 30 VDC
Over-voltage protection	36 VDC
Error limits (of final value)[1]	≤ ± 1.0 %
Medium temperature	-50 ... +200 °C
Environmental temperature	-20 ... +80 °C
Storage temperature	-20 ... +85 °C

Options & Ordering Information

Measuring range	Output signal	Order number
-50 ... +200 °C	0 ... 20 mA ISDS	3973-04-S-01.00
-50 ... +200 °C	4 ... 20 mA	3969-04-01.00

HySense TE 200 Temperature Sensor

- Hand-held sensor
- Measures fluids or surfaces
- Ideal for mobile use
- Suited for all Hydrotechnik instruments
- With Hydrotechnik ISDS
- Instantly ready to use

Technical data

Supply voltage Ub	12 ... 30 VDC
Current consumption	4 mA
Over-voltage protection	36 VDC
Fehlergrenze (of final value)[1]	< ± 1,0 %
Medium temperature	see measuring range

Features

Measuring principle	Pt 100 (platinum meas. resistor acc. to DIN 43760, class B)
Output signal	4...20 mA
Electrical meas. connector	6 pole device connector, M16 x 0.75
Connection wire	spiral cable 1.2 m
Sensor	high-grade steel 1.451, 150 mm
Protection type (EN 60529 / IEC 529)	IP 67 (screwed connector)
Weight	~ 207 g

Options & Ordering Information

Measuring range	Sensor tip	Order number
-50 ... +200 °C		3170-01-S-03.00
-50 ... +400 °C		3170-01-S-07.00
-50 ... +200 °C		3170-01-S-06.00
-50 ... +400 °C		3170-01-S-08.00

HySense RS 110 Infra Red RPM Sensor

RS110 (formerly known as DS-03)

The HySense RS110 (formerly known as DS03) provides frequency of rotation via infra red reflection reflective tape supplied with the sensor. Sensors are available with frequency or 4-20mA analogue input.

- Sensor with reflection mark detection
- Works with pulsating red light (LED)
- Polarisation filter eliminates spurious reflections
- Measures from distances 0 ... 500 mm
- Suited for all Hydrotechnik instruments
- Comes with 25 reflection foils

Features

Measuring principle	auto-collimation
Output signal	frequency / 4 ... 20 mA
Electrical meas. connector	5 pole device connector, M16 x 0.75
Measuring range	0 ... 500 mm
Protection type (EN 60529 / IEC 529)	IP 67 (screwed connector)
Material casing	plastic
Weight (frequency)	~ 141 g
Weight (4...20 mA)	~ 320 g

Technical data

Supply voltage Ub	10 ... 30 VDC
Current consumption	30 mA
Response time	500 µs
Environmental temperature	-40 ... +60 °C
Storage temperature	-40 ... +75 °C

Options & Ordering Information

Output signal	Order number
Frequency	3130-02-01.00
4 ... 20 mA	3130-06-01.00

HySense RS 210 Rotational Inductive Speed Sensor

ISDS Intelligent Sensor Detection System

- Inductive rotational speed sensor
- Measuring for special fields-of-use
- Detects e.g. cogs of geared rings
- Suited for all Hydrotechnik instruments
- Used in HySense® QT and QG sensors

Technical data

Supply voltage Ub	6.5 ... 30 VDC
Over-voltage protection	36 VDC
Current consumption	12 ... 15 mA
Mounting orientation	arbitrary
Environmental temperature	-20 ... +85 °C
Storage temperature	-20 ... +85 °C

Features

Measuring principle	inductive with integrated amplifier circuit
Output signal	frequency (square wave)
Electrical meas. connector	5 pole device connector, M16 x 0.75
Mechanical meas. connector	M 10 x 0.75
Material	Aluminium, anodised
Protection type (EN 60529 / IEC 529)	IP 67 (screwed)
Weight	~ 50 g

Options & Ordering Information

Output signal	Order number
Frequency	3107-00-09.00

HySense QT100 / QT110 Flow Turbine

QT100/QT110 (formerly known as RE4)

The HySense QT range (formerly known as RE3,4 & 6) is an axial turbine flow rate meter. The turbine blade wheel is axially driven by the flow stream, rotating in proportion to the mean flow velocity. A non-contacting inductive pickup generates a pulse signal.
These pulses are then directly converted into a flow measurement by the associate electronic instrumentation. An advantage of our flow measuring turbine are the integrated test points which enable additional measurements of pressure & temperature.

The QT106 is now available with CANopen sensors fitted for integration in to your existing CAN line opening up further measuring possibilities.

- Output signal analog or frequency
- Developed for mineral oils
- Allows bi-directional volume flow rate measurement
- Supplied with Pressure and Temperature Test Points
- Optional with Hydrotechnik ISDS
- Compact, high pressure design

Features

Calibration viscosity	30 cSt[1]
Output signal	frequency (square wave) / 4 ... 20 mA
Electrical meas. connector	6-pole (ISDS) or 5-pole device plug, M16 x 0.75
Protection type (EN 60529 / IEC 529)	IP 40
Material casing / turbine wheel	Aluminium AlZnMgCu 1.5 / 1.4122 or 1.0718
Material sealing	FKM

Technical data

Mounting orientation	arbitrary
Supply voltage Ub	12 ... 24 VDC
Current consumption	12 ... 15 mA (frequency) / 24 ... 31 mA (4 ... 20 mA)
Over-voltage protection	36 VDC
Response time	none (frequency) / 250 ms (4 ... 20 mA)
Medium temperature	max. 120 °C
Environmental / storage temperature	-20 ... +85 °C

Options & Ordering Information

	Output signal	Measuring range (l/min)	Viscosity range mm²/s (cSt)	Measuring connector	Allowed working pressure bar	MPa	PSI	Error limits	Weight g	Order number
... with ISDS	QT 100 frequency (square wave)	1 ... 10	1 ... 30	ISO228-G¼	420	42	6,000	± 0.5 %[2]	630	31V7-01-S-35.030
		2 ... 75	1 ... 100	ISO228-G¾					785	31V7-70-S-35.030
		9 ... 300	1 ... 100	ISO228-G1					1,125	31V7-71-S-35.030
		16 ... 600	1 ... 100	ISO228-G1¼	350	35	5,000		1,380	31V7-72-S-35.030
	QT 110 analog 4 ... 20 mA	1 ... 10	1 ... 30	ISO228-G¼	420	42	6,000	± 0.7 %[3]	740	31G7-01-S-35.030
		2 ... 75	1 ... 100	ISO228-G¾					895	31G7-70-S-35.030
		9 ... 300	1 ... 100	ISO228-G1					1,235	31G7-71-S-35.030
		16 ... 600	1 ... 100	ISO228-G1¼	350	35	5,000		1,490	31G7-72-S-35.030
... without ISDS	QT 100 frequency (square wave)	1 ... 10	1 ... 30	ISO228-G¼	420	42	6,000	± 2.5 %[2]	630	31V7-01-35.030
		2 ... 75	1 ... 100	ISO228-G¾					785	31V7-70-35.030
		9 ... 300	1 ... 100	ISO228-G1					1,125	31V7-71-35.030
		16 ... 600	1 ... 100	ISO228-G1¼	350	35	5,000	± 2.0 %[2]	1,380	31V7-72-35.030
	QT 110 analog 4 ... 20 mA	1 ... 10	1 ... 30	ISO228-G¼	420	42	6,000	± 2.7 %[3]	740	31G7-01-35.030
		2 ... 75	1 ... 100	ISO228-G¾					895	31G7-70-35.030
		9 ... 300	1 ... 100	ISO228-G1					1,235	31G7-71-35.030
		16 ... 600	1 ... 100	ISO228-G1¼	350	35	5,000	± 2.2 %[3]	1,490	31G7-72-35.030

[2] of current reading [3] of final value

HySense QT200 / QT210 Flow Turbine Sensor

QT200/QT210 (formerly known as RE6)

The HySense QT200/210 operates in the same manner as the QT100/ QT110 flow turbine but is manufactured in non corrosive materials and calibrated to work with water or other low viscosity media.

- Output signal analog or frequency
- Developed for water and watery media
- Allows bi-directional flow rate measurement
- Supplied with Pressure and Temperature Test Points
- Optionally with Hydrotechnik ISDS
- Compact high pressure design

Features

Calibration viscosity	1 mm²/s (cSt)
Output signal	frequency (square wave) / 4 ... 20 mA
Electrical meas. connector	6-pole (ISDS) or 5-pole device plug, M16 x 0.75
Protection type (EN 60529 / IEC 529)	IP 40
Material casing / turbine wheel	high-grade steel X12CrNiS18 8 (passivated) / 1.4122 or 1.0718
Material sealing	FKM

Technical data

Mounting orientation	arbitrary
Supply voltage Ub	12 ... 24 VDC
Current consumption	12 ... 15 mA (frequency) / 24 ... 31 mA (4 ... 20 mA)
Over-voltage protection	36 VDC
Response time	none (frequency) / 250 ms (4 ... 20 mA)
Medium temperature	max. 120 °C
Environmental / storage temperature	-20 ... +85 °C

Options & Ordering Information

	Output signal	Measuring range (l/min)	Viscosity range mm²/s (cSt)	Measuring connector	Allowed working pressure bar	MPa	PSI	Error limits	Weight g	Order number
... with ISDS	QT 200 frequency (square wave)	1 ... 10	1 ... 30	ISO228-G¼	420	42	6,000	± 0.5 %[2]	690	33V7-01-S-35.001
		5 ... 100	1 ... 10	ISO228-G¾					1,930	33V7-77-S-35.001G
		9 ... 300	1 ... 10	ISO228-G1					3,300	33V7-78-S-35.001G
		16 ... 600	1 ... 10	ISO228-G1¼	350	35	5,000		4,035	33V7-79-S-35.001G
	QT 210 analog 4 ... 20 mA	1 ... 10	1 ... 30	ISO228-G¼	420	42	6,000	± 0.7 %[3]	800	33G7-01-S-35.001
		2 ... 75	1 ... 10	ISO228-G¾					2,040	33G7-77-S-35.001G
		9 ... 300	1 ... 10	ISO228-G1					3,410	33G7-78-S-35.001G
		16 ... 600	1 ... 10	ISO228-G1¼	350	35	5,000		4,145	33G7-79-S-35.001G
... without ISDS	QT 200 frequency (square wave)	1 ... 10	1 ... 30	ISO228-G¼	420	42	6,000	± 2.5 %[2]	630	33V7-01-35.001
		7.5 ... 75	1 ... 10	ISO228-G¾					785	33V7-77-35.001G
		15 ... 300	1 ... 10	ISO228-G1					1,125	33V7-78-35.001G
		25 ... 600	1 ... 10	ISO228-G1¼	350	35	5,000	± 2.0 %[2]	1,380	33V7-79-35.001G
	QT 210 analog 4 ... 20 mA	1.... 10	1 ... 30	ISO228-G¼	420	42	6,000	± 2.7 %[3]	740	33G7-01-35.001
		7.5 ... 75	1 ... 10	ISO228-G¾					895	33G7-77-35.001G
		15 ... 300	1 ... 10	ISO228-G1					1,235	33G7-78-35.001G
		25 ... 600	1 ... 10	ISO228-G1¼	350	35	5,000	± 2.2 %[3]	1,490	33G7-79-35.001G

[2] of current reading [3] of final value

HySense QL100 / QL110 / QL200 / QL210 Flow Turbine Sensor with loading valve

QL100 / QL110

- With manual restrictor valve for pump loading
- Output signal analogue or frequency
- Developed for low to medium viscosity mineral oils
- Optionally with Hydrotechnik ISDS

Features

Calibration viscosity	30 mm²/s (cSt)
Output signal	QL 100: frequency (square wave) / QL 110: 4 ... 20 mA
Electrical meas. connector	6-pole (ISDS) or 5-pole device plug, M16 x 0.75
Protection type (EN 60529 / IEC 529)	IP 40
Material casing / turbine wheel	high-grade steel X12CrNiS18 8 (passivated) / 1.4122 or 1.0718
Material sealing	FKM

Technical data

Mounting orientation	arbitrary
Supply voltage Ub	12 ... 24 VDC
Current consumption	12 ... 15 mA (QL 100) / 24 ... 31 mA (QL 110)
Over-voltage protection	36 VDC
Response time	0.5 ms (QL 100) / 250 ms (QL 110)
Medium temperature	max. 120 °C
Environmental / storage temperature	-20 ... +85 °C

Options & Ordering Information

ISDS	Output signal	Measuring range (l/min)	Viscosity range mm²/s (cSt)	Measuring connector	Allowed working pressure bar	MPa	PSI	Error limits	Weight g	Order number
yes	Frequency	15 ... 300	1 ... 100	ISO228-G1	350	35	5,000	± 0.5 %[2]	4,325	31VB-71-S-35.030
	4 ... 20 mA							± 0.7 %[3]	4,425	31GB-71-S-35.030
no	Frequency							± 2.5 %[2]	4,325	31VB-71-35.030
	4 ... 20 mA							± 2.7 %[3]	4,425	31GB-71-35.030

QL200 / QL210

- Specially designed measuring turbine for high flows
- With manual restrictor valve for pump loading
- Output signal analogue or frequency
- Developed for low to medium viscosity mineral oils
- Optionally with Hydrotechnik ISDS

Features

Calibration viscosity	30 mm²/s (cSt)
Output signal	QL 200: frequency (square wave) / QL 210: 4 ... 20 mA
Electrical meas. connector	6-pole (ISDS) or 5-pole device plug, M16 x 0.75
Protection type (EN 60529 / IEC 529)	IP 40
Material casing / turbine wheel	3.4365 / 1.0718
Material sealing	FKM

Options & Ordering Information

ISDS	Output signal	Measuring range (l/min)	Viscosity range mm²/s (cSt)	Measuring connector	Allowed working pressure bar	MPa	PSI	Error limits	Weight g	Order number
yes	Frequency	12 ... 600	1 ... 100	ISO228-G1¼	420	42	6,000	± 0.5 %[2]	6,520	31VB-72-35.030S2
	4 ... 20 mA							± 0.7 %[3]	6,630	31GB-72-35.030S2
no	Frequency							± 2.5 %[2]	6,520	31VB-72-35.030A2
	4 ... 20 mA							± 2.7 %[3]	6,630	31GB-72-35.030A2

[2] of current reading [3] of final value

HySense QT300 Flow Turbine Sensor

QT300

- The new HySense® QT 300 measures volume flow rates up to 1,000 l/min and has a working pressure up to 420 bar.
- Two MINIMESS® test points serially enable problem free collection of further measurands (pressure & temperature) simultaneously.
- Safe integration into existing pressure systems is possible with the 2" SAE flange connectors delivered with the turbines.
- Further models with BSP or NPT connections are also available with higher flows or pressure ratings on request.

Contained in delivery:
- 4 pc. SAE-flange halfs 2“, straight (420 bar)
- 1 pc. SAE-sealing (O ring) ID 56.74 x 3.53 90 shore A, NBR
- 8 pc. cylinder screws DIN 912 (ISO4762) M20 x 70 – 8.8

Features

Measuring principle	volume flow
Viscosity range	1 ... 100 mm²/s (cSt)
Medium temperature	max. +120 °C
Environmental temperature	-20 ... +85 °C
Storage temperature	-20 ... +85 °C
Output signal	frequency (rectangular signal)
Supply voltage Ub	6.5 ... 30 VDC
Error limit	± 3.0 % of current value
Electrical measuring connector	5 pole device connector, M16 x 0.75
Protection type (EN 60529 / IEC 529)	IP 40
Tightening torque	10 Nm (± 2 Nm)
Calibration viscosity	30 mm²/s (cSt)
Material turbine casing	high-grade steel X10CrNiS189 (1.4305)
Material turbine wheel	1.4104
Material sealings	FKM
Material sensor casing	3.1645
Suitable measuring cable	MK 01

Special design for high pressure (500 bar) and fitted with pressure & temperature test points.

Contact us for non standard requirements.

Options & Ordering Information

Measuring range	Maximum working pressure		Error limit	Weight	Order number
l/min	bar	MPa	of current value	g	
45 ... 1,000	420	42	± 3.0 %	11,440*	31W7-88-35.030

HySense QG100 / QG 110 Gear Flow Meter

QG100/QG110 (formerly known as GFM)

The HySense QG range (formerly known as GFM) measuring system works accordingly to the positive displacement principle. The measuring accuracy is largely independent of the fluid viscosity and provides further measuring possibilities with high accuracy vs an axial turbine or similar. Low flow rates are easily measured with this design. The QG range is useful for accurate measurement of pump case drains or leakage flows or example.

4...20mA output models supplied with f/l convertor

- Positive displacement Gear wheel volume flow rate sensor
- Output signal analog or frequency
- Broad viscosity range
- Direction detection and impulse doubling possible
- Optionally with Hydrotechnik ISDS
- High Temperature version available on request

Features

Viscosity range / calibration viscosity[1]	5 ... 500 mm²/s (cSt) / 30 mm²/s (cSt)
Output signal	frequency (sqaure wave) / 4 ... 20 mA
Electrical meas. connector	6-pole (ISDS) or 5-pole device plug, M16 x 0.75
Protection type (EN 60529 / IEC 529)	IP 40
Material casing / cogs	1.4305, 0.7060 / 1.7131
Material sealing	FKM
Tightening torque sensor	< 0.5 Nm, thread pin (collet) T 3362000

Technical data

Mounting orientation	arbitrary
Supply voltage Ub	12 ... 24 VDC
Current consumption	15 mA (frequency) / 27 ... 31 mA (4 ... 20 mA)
Over-voltage protection	36 VDC
Response time	2 kHz (frequency) / 2.5 sec. (4 ... 20 mA)
Medium / environmental / storage temp.	-20 ... +120 °C / -20 ... +80 °C / -20 ... +85 °C

Options & Ordering Information with ISDS sensors

Output signal	Measuring range	Geom. cog volume	Measuring connector	Allowed working pressure			Error limits	Weight	Order number
	(l/min)	cm³		bar	MPa	PSI		g	
QG 100 frequency (square wave)	0.05 ... 5	~ 0,191	ISO228-G¼	630	63	9,100	± 0.5 %[2]	3,000	3143-02-S-35.030
	0.2 ... 30	~ 0,609	ISO228-G3/8“					4,075	3143-03-S-35.030
	0.7 ... 70	~ 2,222	ISO228-G¾“				± 0.4 %[2]	9,000	3143-04-S-35.030
	3 ... 300	~ 8,750	SAE flange 1¼“	420	42	6,000	± 0.5 %[2]	32,330	3143-05-S-35.030
QG 110 Analogue 4 ... 20 mA	0.05 ... 5	~ 0,191	ISO228-G¼	630	63	9,100	± 0.7 %[3]	3,110	3185-02-S-35.030
	0.2 ... 30	~ 0,609	ISO228-G3/8“					4,185	3185-03-S-35.030
	0.7 ... 70	~ 2,222	ISO228-G¾“				± 0.6 %[3]	9,110	3185-04-S-35.030
	3 ... 300	~ 8,750	SAE flange 1¼“	420	42	6,000	± 0.7 %[3]	32,440	3185-05-S-35.030

Options & Ordering Information with standard sensors

QG 100 frequency (square wave)	1.0 ... 10.0	~ 0,191	ISO228-G¼	630	63	9,100	± 0.5 %[2]	3,000	3143-02-35.030
	0.2 ... 30	~ 0,609	ISO228-G3/8“					4,075	3143-03-35.030
	0.7 ... 70	~ 2,222	ISO228-G¾“				± 0.4 %[2]	9,000	3143-04-35.030
	3 ... 300	~ 8,750	SAE flange 1¼“	420	42	6,000	± 0.5 %[2]	32,330	3143-05-35.030
QT 110 Analogue 4 ... 20 mA	1.0 ... 10.0	~ 0,191	ISO228-G¼	630	63	9,100	± 0.7 %[3]	3,110	3185-02-35.030
	0.2 ... 30	~ 0,609	ISO228-G3/8“					4,185	3185-03-35.030
	0.7 ... 70	~ 2,222	ISO228-G¾“				± 0.6 %[3]	9,110	3185-04-35.030
	3 ... 300	~ 8,750	SAE flange 1¼“	420	42	6,000	± 0.7 %[3]	32,440	3185-05-35.030

[2] of current reading [3] of final value

HySense P0180 displacement sensor

Highly accurate position measurement

P0180 string potentiometer

The HySense P0180 displacement sensor is a compact string potentiometer used for measuring displacement of cylinders boom arms and other linear devices. Developed for use with Hydrotechnik instruments, such useful information can now be measured and analysed in conjunction with pressure, temperature, RPM and flow data.

- The HySense P0180 works on the measuring wire principle. It can be easily mounted and does not need linear guiding. It is suitable for use at load cranes, hydraulic presses and other installations where distances need to be measured or changes of position detected. All mechanical and electronic components are protected by a solid casing.
- A specially manufactured and calibrated wire is tightly wound around a high-precision drum that is driven against the pulled direction by a spring motor. Through the detection of the winding process the sensor converts the linear movement into an electrical signal.
- The sensor is compact, has a very high resolution and accuracy. It is highly dynamic and is insensitive to environmental influences.

Technical Data

Measuring principle	measuring wire
Output signal	4 ... 20 mA
Protection type (EN 60529 / IEC 529)	IP 65 (only with serial cable box)
Material casing / measuring wire	aluminium and high-grade steel / high-grade steel
Signal type	two wires
Supply voltage Ub	12 ... 27 VDC
Current consumption	max. 35 mA
Temperature coefficient	±0.01 % / K
Nonlinearity	< ±0.1 % of the measuring range
Output noise	50 mVeff
Resolution	quasi infinite
Environmental temperature	-20 ... +85 °C
Storage temperature	-20 ... +85 °C
EMV test	IEC 1000-4-2, -4, -5
Vibrational stability	on request
Shock stability	on request

Options & Ordering Information with standard sensors

Measuring range	Extraction force (max.)	Retraction force (max.)	Measure A	Weight	Order Number
mm	N	N	mm	g	
0 ... 100	4.7	3.0	8.0	681	3183-13-03.37
0 ... 375	7.4	3.9	12.5	869	3183-13-05.37
0 ... 1,000	5.3	2.9	8.0	1,206	3183-13-02.37
0 ... 3,000	6.2	3.0	10.0	1,498	3183-13-02.37

HySense FO, TQ & VB Sensors

VB110 Vibration sensor

The PO180 vibration sensor comprises a capacitive acceleration sensor for data collection with short response time under serious environmental conditions. It is mounted on a magnetic foot that can be used to attach the sensor to any metallic surfaces. The frequency output allows connection to all Hydrotechnik measuring instruments.

Measuring range	Weight	Order Number
g	g	
± 50	1,498	3183-13-02.37

Further technical information on request

FO110 Force sensor according to the deflecting beam principle

Since a force and the deflection of a beam is proportional, the FO110 sensor is able to determine a force by measuring its elongation or change in length.
Due to its compact design, these traction pressure force sensors can be used in the laboratory, as well as in industrial environments. Made with corrosion proof steel, the sensors have a standardised nominal characteristic value with a standard 4-20mA output. They can be mounted easily allowing simple integration into existing structures.

Available Ranges: 0...1, 1.5, 2, 5, 10 & 20 kN
Further technical information on request

FO210 Traction force sensor

The FO210 force sensor works to centre line force measurement principles. for recording of traction forces on lifts, cranes, housings or twisting of masts, towers or platforms.
Connected using a threaded road for easy fastening, the housing for the resistance strain gauge is protected from mechanical or chemical damage by an aluminium tube formed from a highly elastic compound. Full bridges of resistance strain gauges measure the elongation and lateral expansion caused by traction forces.

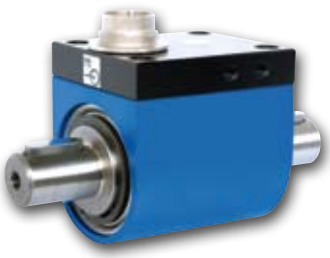
Available Ranges: 0...5, 10, 20, 50, 100, 150 & 200 kN
Further technical information on request

FO310 Force sensors according to pressure force principle

Very small pressure force sensor for measuring ranges up to 100 kN that can be used to check moulding force (for example). It is manufactured with corrosion-free high-grade steel and protected in accordance to IP 65. It can be equipped with an overload protection on request.

Available Ranges: 0...1, 5, 10, 20, 50 & 100 kN
Further technical information on request

TQ110 Rotating torque sensors with friction ring



Highly accurate torque sensor, equipped with a cylindric shaft with feather keys on both ends. It is available for several measurement ranges and is designed for continuous rotational speed of 1,500 to 2,000 rpm.

Available Ranges: 0...50, 100, 200 & 500 Nm
Further technical information on request

Minimess® Test Point Sensor Adaptors

- Minimess® test points offer uniquely simple access to high pressure systems. Developed by Hydrotechnik more than 50 years ago, you can find it today million fold in hydraulic and other high-pressure systems.
- Minimess® test points makes measuring easy: screw sensor into the direct connector, remove cap and then screw the direct connector on our test point. The sensor comes in contact with the medium for instant pressure or temperature measurements - without leakages – guaranteed.

Straight Minimess direct connectors


For PR100 series


For PR300 series

For sensor ...	Screw series	Pmax	Order No
G1/4" BSP Female for HySense PR100 series	1620	630 bar	2103-07-18.62N
	1215		2101-07-18.62N
	1615		2102-07-18.62
	1604	400 bar	2106-07-18.62N
G1/4" BSP Male for HySense PR300	1620	630 bar	2103-07-41.62N
	1215		2101-07-41.62N
	1615		2102-07-41.62N

90° Minimess direct connectors


For PR100 series


For PR300 series

For sensor ...	Screw series	Pmax	Order No
G1/4" BSP Female for HySense PR100 series	1620	630 bar	2146-13-05.00N
	1215		2146-14-02.00N
	1615		2146-57-05.00
G1/4" BSP Male for HySense PR300	1620	630 bar	2146-54-19.40N
	1215		2146-54-19.20N
	1615		2146-54-19.30

Minimess® p/T test points

p/T test points connect temperature and dual pressure/temperature sensors with high pressure systems.

For sensor ...	Connecting thread	Sealing	TKZ
HySense PR 1xx, TP 180, TE 101	ISO 228-G¼	NBR	2149-04-15.13N
		FKM	2149-04-15.53N

For sensor ...	Connecting thread	Sealing	TKZ
HySense PR 1xx, TP 180, TE 101	M10x1	NBR	2149-04-19.13N
		FKM	2149-04-19.13N

Minimess® Microbore Hoses

You can use Minimess® microbore hoses in case of limited space or to access awkward to reach testing points

- Please refer to our microbore hose section on page 19 for more information and ordering options
- Allows access to all Minimess® test point series as well as many other industrial thread standards such as BSP, NPT, JIC etc.

CAN Accessories, Replacement Flow Sensors & Signal Generators

CAN cables & accessories

CAN lines can be constructed with several sensors, MultiXtend devices and the measuring instruments MultiSystem 5060 and 8050. Here you can find accessories required for connecting and extinding CANbus measuring lines.

	Beginning	End	Length	Order No.
Connection cable MS 5060 to MultiXtend or sensor	8-pole circ. connector	M12 jack CAN	1.00 m	8824-M5-01.00
Connection cable MS 8050 to MultiXtend or sensor	Sub-D plug	M12 jack CAN	1.00 m	8824-N1-01.00
Cable to build up a CAN line	M12 plug CAN	M12 jack CAN	1.00 m	8824-N3-01.00
Y-splitter for CAN line	M12 plug CAN	x2 M12 jack CAN	-	8808-50-01.01
Terminal resistor 120 Ω	M12 plug CAN	-	-	8872-02-01.01
MultiXtend CAN box mains power charger	M12 plug CAN	-	-	8812-00-00.34

Spare Sensors for HySense Flow Meter Series

Spare part	... for HySense® sensor	ISDS (6 pin)	Standard (5 pin)
Inductive sensor, IP 67, frequency	QT 100 / QT 200	3107-00-S-09.00	3107-00-09.00
Inductive sensor, dampened, frequency	QT 100 / QT 200	3107-00-S-09.30	3107-00-09.30
Inductive sensor, frequency	QL 100 / QL 200 / QL 300	3107-00-S-09.70	3107-00-09.70
GMR sensor, frequency	QG 100	3107-00-S-45.00	3107-00-45.00
Inductive sensor with integrated f/I converter, 0 ... 20 mA	QT 110 / QT 210	3107-00-S-25.00	3107-00-25.00
Inductive sensor with integrated f/I converter, 4 ... 20 mA	QT 110 / QT 210	3107-00-S-26.00	3107-00-26.00

Signal generator

Device to generate simulated measuring signals with two analogue (0-20mA) and one frequency signal output, suitable for all Hydrotechnik instruments.

Product	Order No.
Signal generator	3160-00-00.43

Chargers, Carry Cases & Measuring Cables

Power pack for MH 2020, 3010, 3050, 5060

Description	Sensor	Part number
100 to 240 VAC (50/60 Hz) 6 VDC/850 mA; with country adaptor EU, UK, US	Multi-Handy 2020	8812-00-00.33
100 to 240 VAC (50/60 Hz) 24 VDC/630 mA; with country adaptor EU, UK, US, AUS	Multi-Handy 3010 Multi-Handy 3050 Multi-Handy 5060	8812-20-02.00

Carry cases for MH 2020, 3010, 3050, 5060

Description	Colour	Part number
Plastic case, complete, for Multi-Handy 2020	Red	3160-00-69.01
Plastic case, complete, with measuring turbine box for Multi-Handy 3020	Blue	3160-00-25.02
Plastic case, complete, with measuring turbine box for Multi-Handy 3010 & Multi-Handy 5060	Black	3160-00-70.01
Aluminium transportation case, complete for Multi-Handy 3050	Red	3160-00-62.02
Aluminium transportation case, complete, with measuring turbine box for Multi-Handy 3050	Red	3160-00-62.03
Aluminium transportation case, complete, without measuring turbine box for Multi-Handy 3050	Red	3160-00-70.02
Aluminium transportation case, complete, with measuring turbine box for Multi-Handy 5060	Red	3160-00-70.03

Measuring Cables for Hydrotechnik 5 pin & ISDS (6 pin) sensors

Description Standard	Length in m	Part number
Measuring cable MKS- 5-pole/5-pole (plug/socket)	2,5	8824-91-02.50
Measuring cable MKS- 5-pole/5-pole (plug/socket)	5,0	8824-91-05.00
Measuring cable MKS- 5-pole/5-pole (plug/socket)	10,0	8824-91-10.00
ISDS		
Measuring cable MKS- 6-pole/6-pole (plug/socket)	2,5	8824-S1-02.50
Measuring cable MKS- 6-pole/6-pole (plug/socket)	5,0	8824-S1-05.00
Measuring cable MKS- 6-pole/6-pole (plug/socket)	10,0	8824-S1-10.00

USB data download cable for MH 2020, 3020, 3050, 5060, 8050

Description	Measuring instrument	Length in m	Part number
USB-A/USB-B plug	Multi-Handy 2020	2,0	8824-F4-02.00
	Multi-Handy 3020		
	Multi-Handy 3050		
	Multi-System 5060		
	Multi-System 8050		

Measuring Cables and RS110 RPM probe accessories

Measuring Cable for HySense Pressure/Temperature Sensor TP180

Description	Measuring instrument	Length Meters	Part number
8-pole cable socket/ 2x 5-pole plug	All Hydrotechnik	2.5	8824-D6-02.50
8-pole cable socket/ 2x 5-pole plug	All Hydrotechnik	5.0	8824-D6-05.00

Reflection foil for RS110 RPM Sensor

Description	Measuring instrument	Part number
Reflective Foils, 50 piece pack	RS110 RPM sensor	8840-02-01.01

Magnetic holder for RS110 RPM Sensor

Description	Measuring instrument	Part number
Magnetic holder for RS110 RPM Sensor	RS110 RPM sensor	3130-03-01.00