



Diagnostic Test Equipment for Hydraulics

Catalogue 4054-1/UK



All the instruments meet the guidelines of the European Community (EU).
It is confirmed that these products are approved acc. to following standards.



DIN/ EN 61000-6-2
DIN/ EN 61000-6-3

Note!

This document and other information from Parker Hannifin GmbH & Co. KG, provide product or system options for further investigation by users having technical expertise. Before you select or use any product or system it is important that you analyse all aspects of your application and review the information concerning the product or system in the current product catalogue. Due to the variety of operating conditions and applications for these products or systems, the user, through his own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance and safety requirements of the application are met. The products are subject to change by Parker Hannifin GmbH & Co. KG at any time without notice.



Technical subject to change. September 2005.

© Copyright 2005, Parker Hannifin Corporation. All Rights Reserved.

	Page
1 ServiceJunior/ServiceJunior <i>wireless</i>	6-9
1.1 Product Specifications	6
1.2 Function Specifications	7
1.3 Technical Data	8-9
2 Serviceman	10-15
2.1 Product Specifications	10
2.2 Function Specifications	11
2.3 Technical Data	12
2.4 Pressure Measurement	13
2.5 Flow and RPM Measurement	14
2.6 Software	15
3. Service Master	16-24
3.1 Product Specifications	16
3.2 Technical Data	17
3.3 Function Specifications	18-20
3.4 Pressure Measurement	21
3.5 Flow and RPM Measurement	22
3.6 Electrical Signal Measurement	23
3.7 Software SensoWin®	24
4 Pressure Measurement	25-28
4.1 Pressure Sensors	25
4.2 Technical Data	26
4.3 Diagnostic Adaptor	27-28
5 Temperature Measurement	29-32
5.1 Serviceman	30
5.2 Service Master	31
5.3 Technical Data	32
6 Flow Measurement	33-48
6.1 Flow Meter	34-37
6.2 Flow Turbine/Hydraulic Tester	38-43
6.3 Gear Flow Meter	44-48
7 Speed Measurement	49-50
7.1 Technical Data	50
8 Kits Serviceman/Service Master	51-52
9 Calibration Service	53
10 Index	54

- Long-term stability
- Rugged design
- Easy operation
- Flexible use on site
- Documentation of measured values

SensoControl® handmeters and complete measuring systems are perfectly suitable measuring tools for every application. Whether they are used in the industrial area, in mobile hydraulics, for service or repair: measuring and processing of hydraulic values is the basis of safe trouble shooting. The systematic search for errors with modern aids is something the service engineer simply cannot do without.

High-speed processes, such as switching valves, cylinder strokes, pressure peaks, differential pressures and flow changes must be measured and evaluated simultaneously.



The **SensoControl®** handmeters have been specially developed for the following applications:

- Measurement and display of all hydraulic values, such as pressure, differential pressure, pressure peaks, temperature and flow, as well as speed.
- They are perfectly suitable for the mobile recording of measured values and feature high precision combined with easy operation.

All measuring devices as well as their accessories are manufactured and tested in our own plants. Our ever-increasing insistence on quality and flexibility make Parker a reliable partner.

Choosing the Right Product

Choice/features	ServiceJunior	Serviceman	Service Master
Measuring and read out			
Read out	ACT - MIN/MAX (Peak-Hold)	ACT - MIN/MAX	ACT - MIN/MAX
2 inputs	—	●	●
3 inputs	—	—	●
4 inputs	—	—	○
6 inputs	—	—	○
Pressure peaks	10 ms	2 ms	1 ms
Pressure	●	●	●
Differential Pressure (P1-P2)	—	●	●
Connection sensors			
Socket 4 pin	—	●	—
Socket 5 pin	—	○	●
Temperature/RPM/Flow	—	●	●
Electrical signals 48VDC/1,5ADC	—	—	●
External sensors (0/4... 20 mA)/(0...10 VDC)	—	—	●
Functions			
Rechargeable battery	battery	●	●
Interface	—	○	●
OnLine-Function	○	○	●
Data recording	—	—	●
Print out graphs	—	—	●
External power supply	—	●	●

- not available
- optional
- standard

- Digital pressure measurement and display
- Accuracy $\pm 0,5\%$ FS
- Display with bar graph (trailing indicator) with peak & hold function
- Pressure peaks captured – 10 ms scanning rate
- Easy operation
- Long-term stability
- Back-lit measured value display
- Pressure ports stainless steel 1/4 BSPP



ServiceJunior Digital Pressure Gauge

The **ServiceJunior** makes possible the measurement and display of pressures with one instrument. Measured values are shown with high precision on a 4-digit display. Pressure peaks are securely captured at a scanning rate of 10 ms.

The **ServiceJunior** is distinctive through its very simple operation. With its convincing price to power ratio, the instrument offers all the advantages of digital pressure measurement.

With immediate effect, measurement data acquisition is entering **a new dimension!**

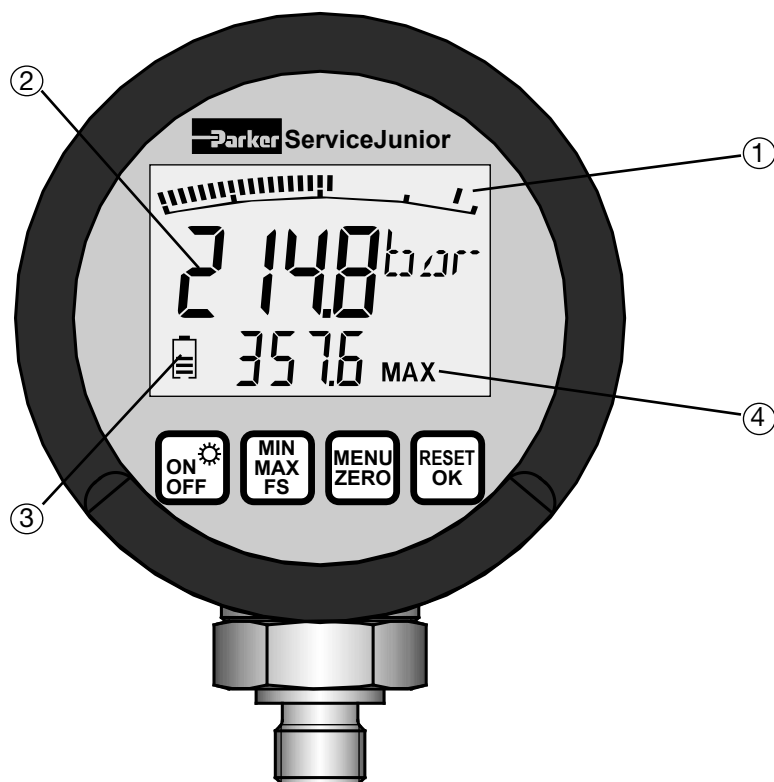
Utilising the **ServiceJunior wireless** from Parker's SensoControl family of products allows you to comfortably record the pressure values taken from one or several measurement points on your machine or installation. Stored measurement data is transmitted to a PC across distances of **up to 50 meters**.

The PC software '**JuniorWin**' allows you to set the limit value and the configuration to suit your needs.

Thus **ServiceJunior wireless** allows you to save time and costs for monitoring machines and installations – comfortably from your plant office.

At the same time you can evaluate and archive the data as well as perform other control functions from the same PC.

The device is ideal for monitoring, maintaining and servicing machines and installations in industrial and mobile hydraulic systems.



- ① Display with bar-graph due to peak & hold function
- ② Actual value back-lit display (15 mm)
- ③ Battery level display
- ④ Display of MIN/MAX or Full Scale Range display (FS)

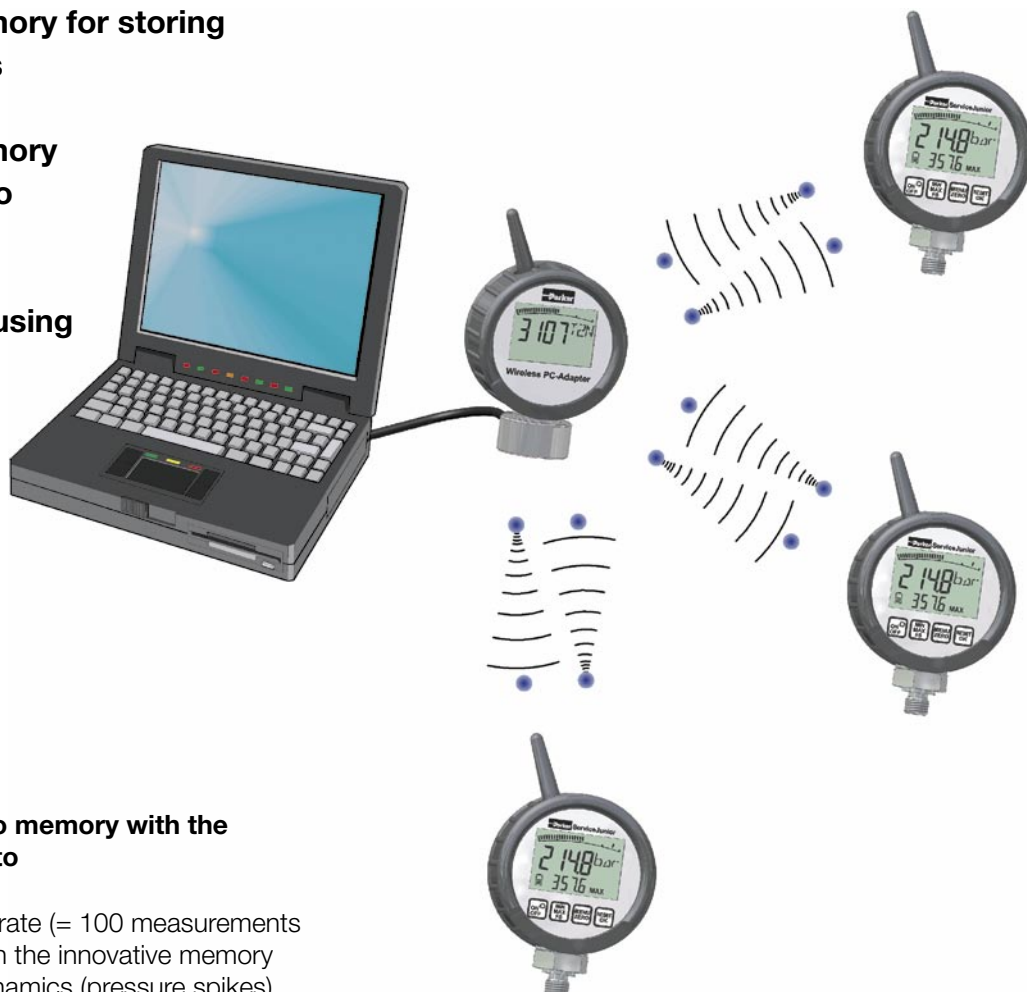
Menu functions

- ON OFF** On/off switch
Back-lit display
- MIN MAX FS** Minimum/maximum value
Full Scale
- MENU ZERO** Menu: auto shut-off
Choice of units
Zero: Zero point equalisation
- RESET OK** Delete MIN/MAX value
Confirm menu function

Digital Pressure Gauge	ServiceJunior	ServiceJunior wireless
Range -1...016 bar 0 ...100/400/600/1000 bar	SCJN-xxx-01	SCJNP-xxx-01-RC
Standard ServiceJunior delivery includes:	1 ServiceJunior (acc. to pressure range) 2 batteries 1.5 VDC AA alkaline 1 adaptor SCA-1/4-EMA-3	
ServiceJunior-Kit	SCJN-KIT-xxx	SCJNP-KIT-xxx-RC
1 Storage case	SCC-120	
1 ServiceJunior	SCJN-xxx-01	SCJNP-xxx-01-RC
1 Adaptor a PC incl. Software	—	SCSW-KIT-JN
with adaptors:		
1 1/4 BSPP female - M16x2 female	SCA-1/4-EMA-3	
1 M16x2 male - M16x2 male	SCA-EMA-3/3*	
1 Test hose assembly 1.500 mm (M16x2)	SMA3-1.500*	

* not available for 1.000 bar

- **Network operations:**
monitor several measurement points
- **Measured data memory for storing**
pressure sequences
- **Read-out data from**
measured data memory
to the PC via a radio
interface
- **Set and evaluate**
measurement data using
PC software
"JuniorWin"

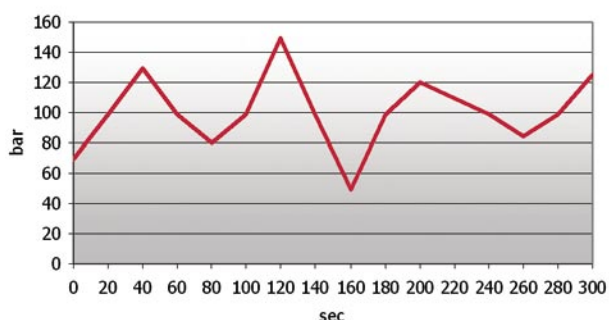


Example of measurement to memory with the settings REC Time/REC Auto

The constant 10 ms scanning rate (= 100 measurements per second) in conjunction with the innovative memory technology ensures that all dynamics (pressure spikes) are captured.

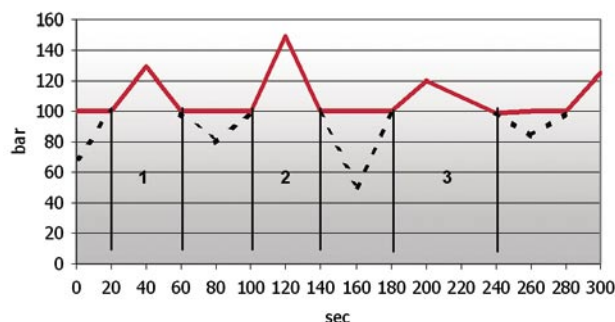
There are two measurement functions available to the user:

REC Time

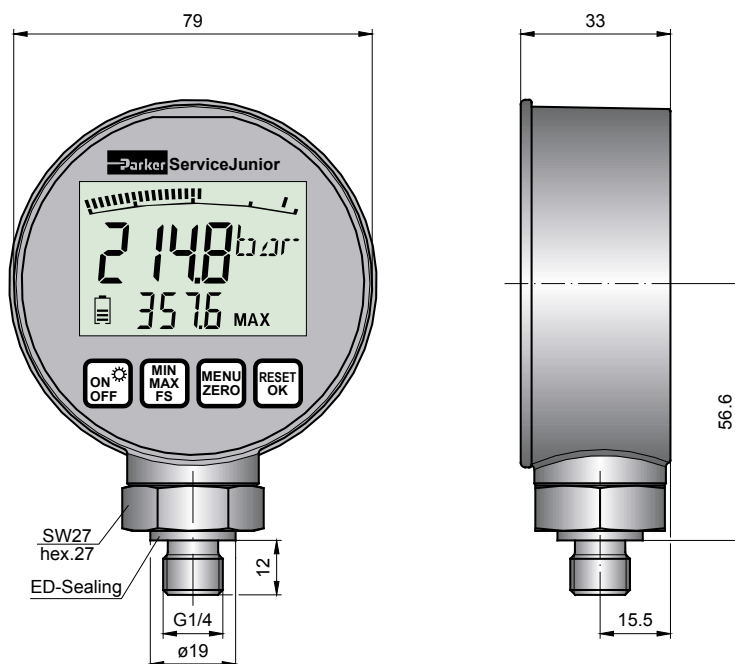


Measurement time (for example, 300 s);
5.000 measurement values are written into the memory
and diagrammed as a curve.
Other measurement times can be set.

REC Auto



Pressure spike monitoring with limit value, for example
100 bar. All pressure values measured above 100 bar
are stored to memory.



Technical Data					
Range (bar)	-1...16	0...100	0...400	0...600	0...1.000
Overload Pressure P _{max}	40	200	800	1.200	1.500
Burst Pressure (bar)	50	800	1.700	2.200	2.500
Housing	Ø = 79 mm; T = 33 mm Zinc die casting with rubber TPE protection cover				
Weight (g)	540				
Port	Stainless Steel 1.4404 1/4" BSPP (ISO 228-1)				
Input	Sensor element ceramics (16 bar) Strain gauge pressure measurement cell 10 ms scanning rate Accuracy ± 0,25% FS typ. ± 0,5% FS max. A/D converter 12 bit 4096 steps resolution				
Display	LC text display 4 ½ digits 50x34 mm Digit size: 15 mm Units: mbar/bar/PSI/Mpa/kPa Back lit illumination Bar graph (trailing indicator) with peak & hold function				
Sealing	NBR				
Parts in Contact with Media	Stainless Steel 1.4404, NBR, ceramic				

Technical Data	
Functions	Units: mbar/bar/PSI/Mpa/kPa MIN/MAX - FullScale Battery level display Auto power Off/On Zero (zero point equalization) Reset (Delete MIN/MAX)
PC-Function*	PC Software "JuniorWin" Read out data from memory to PC via radio interface (2,4 GHz) Operation range 50 m Setup of recording parameters
Memory Function*	5.000 Readings (MAX pressure peaks) Setup of storage interval REC TIME (Time based recording) REC AUTO (Pressure spike monitoring)
Power Supply	2 x 1,5 V alkaline batteries Battery life typ. 1.500/800* hours
Ambient Temperature (°C)	-10...+50
Storage Temperature (°C)	-20...+60
T _{max} Fluid (°C)	+80
Rel. Humidity	< 85%
Protection	EN 60529 (IP 67/IP 54*)
Vibration	IEC 60068-2-6/10...500Hz; 5 g
Shock Load	IEC 60068-2-29/25 g; 11 ms
Reliability Cycles (10 ⁶)	100

* SCJNP = ServiceJunior wireless

- Easy operation
- Prevention of measuring errors due to automatic sensor recognition
- Printer and PC connection
- Two-line display
- Rugged design



The **Serviceman** has 2 inputs for sensors. This enables a differential pressure measurement by pressing only one key. Fast comparisons of actual and set values are done very easily.

The **Serviceman** is extremely robust and insensitive to dirt, so that it can be used in even the toughest conditions. The digital display avoids reading errors.

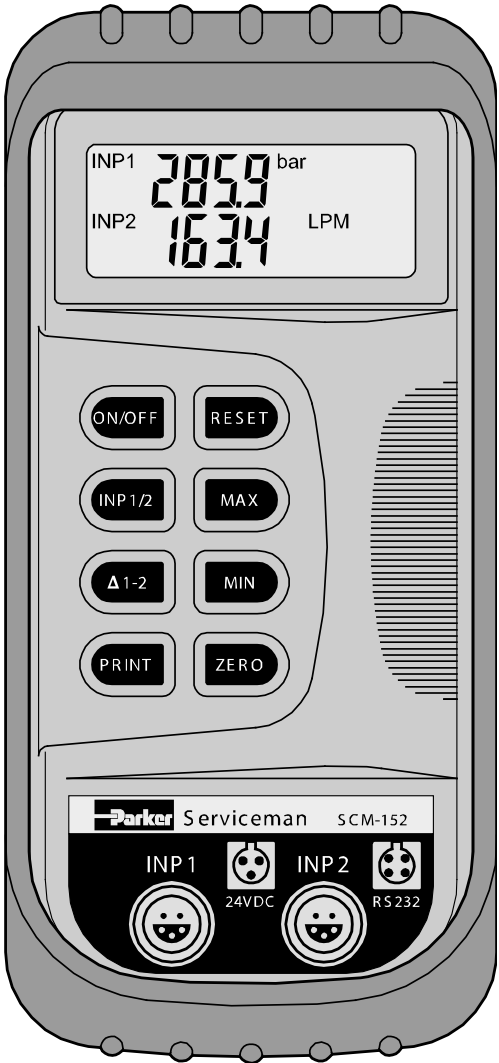
The **Serviceman** is small and light:
perfect for mobile applications.

**Serviceman incl. external power supply
2 Inputs (5 pin) incl. PC Interface**

The data output can be used to connect a PC.
Data printout is valid under the documentation
obligatory under ISO 9001.

The Min/Max memory permits the reading of peak
values. Pressure peaks which could lead to damage are
avoided.

Like all other **SensoControl®** measuring devices, the
Serviceman is provided with sensor recognition. The
measuring ranges are automatically scaled and units
shown on the display. This avoids measuring errors and
time-consuming adjustment work.



- Display

Display (two line)
INP1 and INP2; ΔP display
Battery level display
MIN: Minimum value
- ON/OFF

On/off switch
- INP 1/2

Select button for input
- Δ 1-2

Differential value display
e.g. P1 - P2 = ΔP
- PRINT

Data transfer to PC
- RESET

Delete MIN/MAX-readings
INP1 = INP2:
Equalisation of ΔP-measuring
- MAX

Maximum value (pressure peaks)
- MIN

Minimum value
- ZERO

Zero point equalisation
- INP1/INP2

Sensor inputs
5-pin = push pull
- 24VDC

Power supply or
automotive cable adaptor
SCK-318-05-21
- RS232

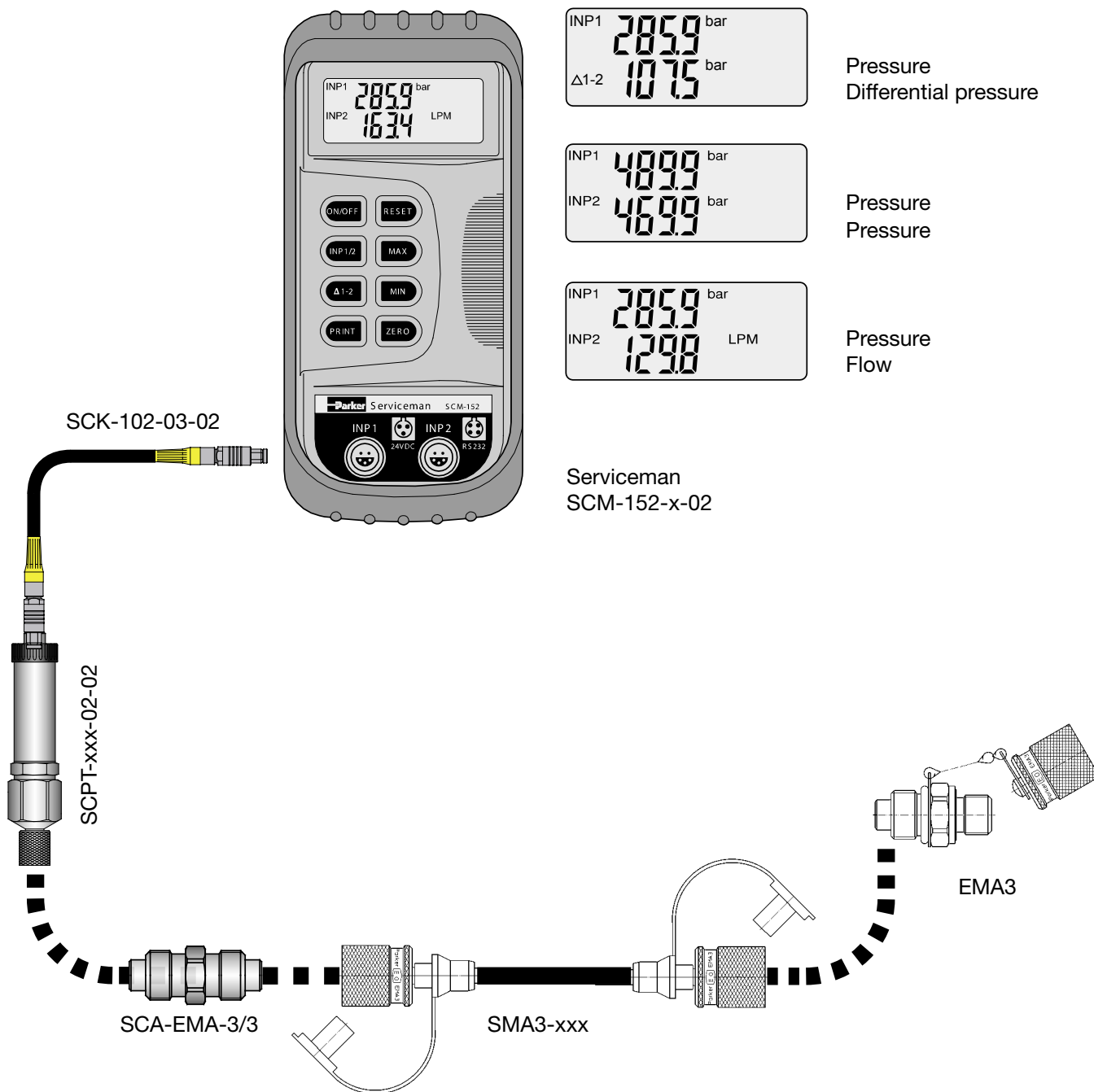
PC interface
SCM-152-2-02

Type	SCM-152-1-02	SCM-152-2-02
PC interface	—	●
Standard delivery includes SCSN-450 (power supply 110/220 VAC)	●	●
Accessories		
Automotive cable adaptor (24 VDC) SCK-318-05-21	●	●
PC-Software Kit SCSW-KIT-152	—	●
Spare battery SC-811	●	●
Charging Unit (220 VAC) for SC-811	●	●

— not available ● serial

	Serviceman	SCM-152-1-02	SCM-152-2-02
Input	2 sensor inputs (5-pin) push-pull	●	●
Display	LC text display (4 digit), 2 line, digit size 8 mm	●	●
Interface	RS232 (4-pin) optional with a standard RS232/USB PC adaptor	—	●
Functions	MIN-/MAX display Zero point equalisation INP1-INP2 differential reading Battery level display Auto power off (15 min)	●	●
Ambient conditions	Operating temperature: 0 ... +50 °C Storage temperature: -20 ... +60 °C Rel. humidity: < 85% Protection according to (EN 60529) (IP 54)	●	●
Power supply	External power supply SCSN-450 or automotive cable adaptor SCK-313-05-21 (24 VDC) Internal battery 9 V/110 mA/h Battery life 5 h	●	●
Housing	ABS with rubber protection Dimensions: 145 x 70 x 40 mm (L/W/H) Weight: 330 g	●	●

— not available ● serial

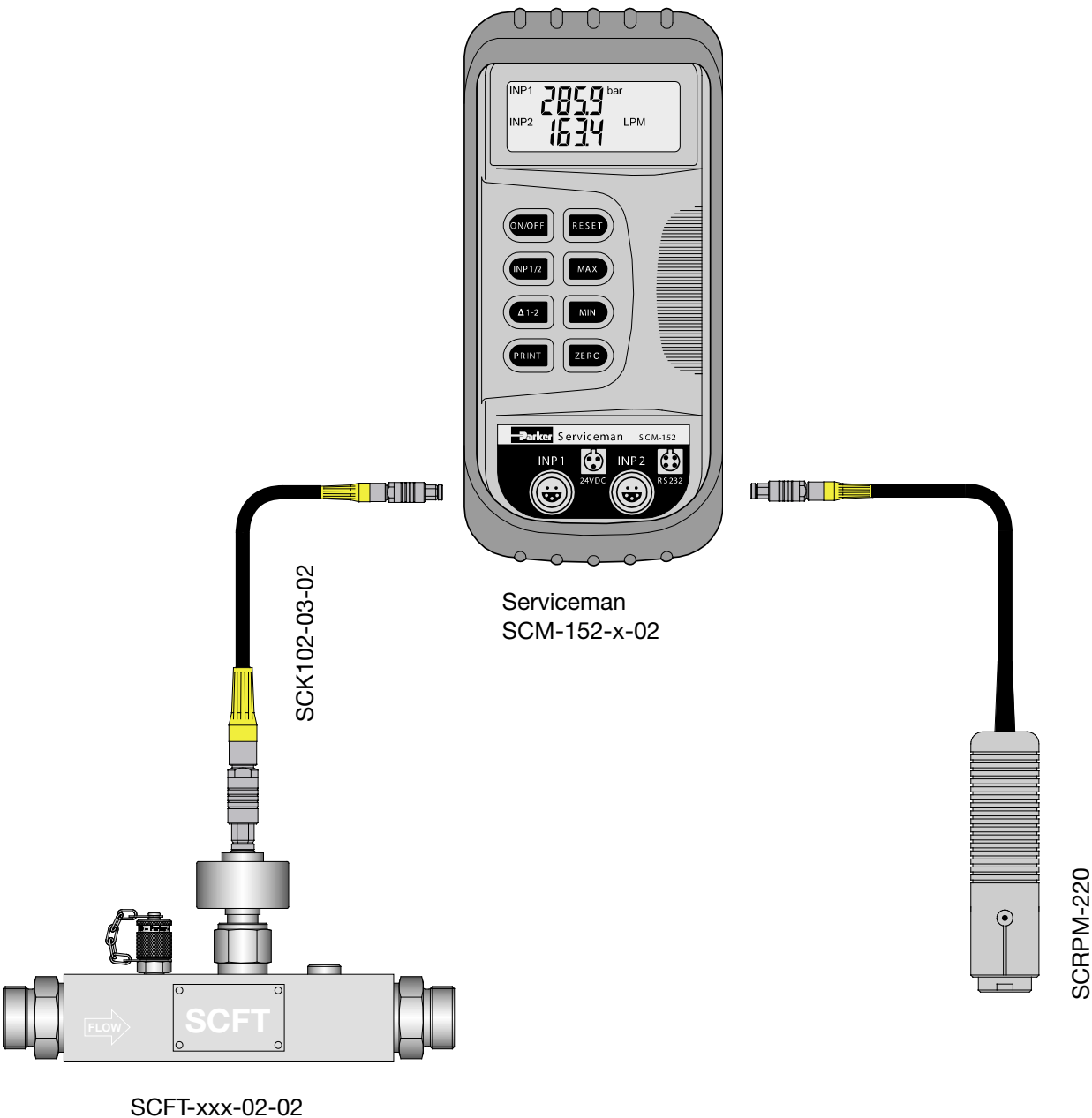


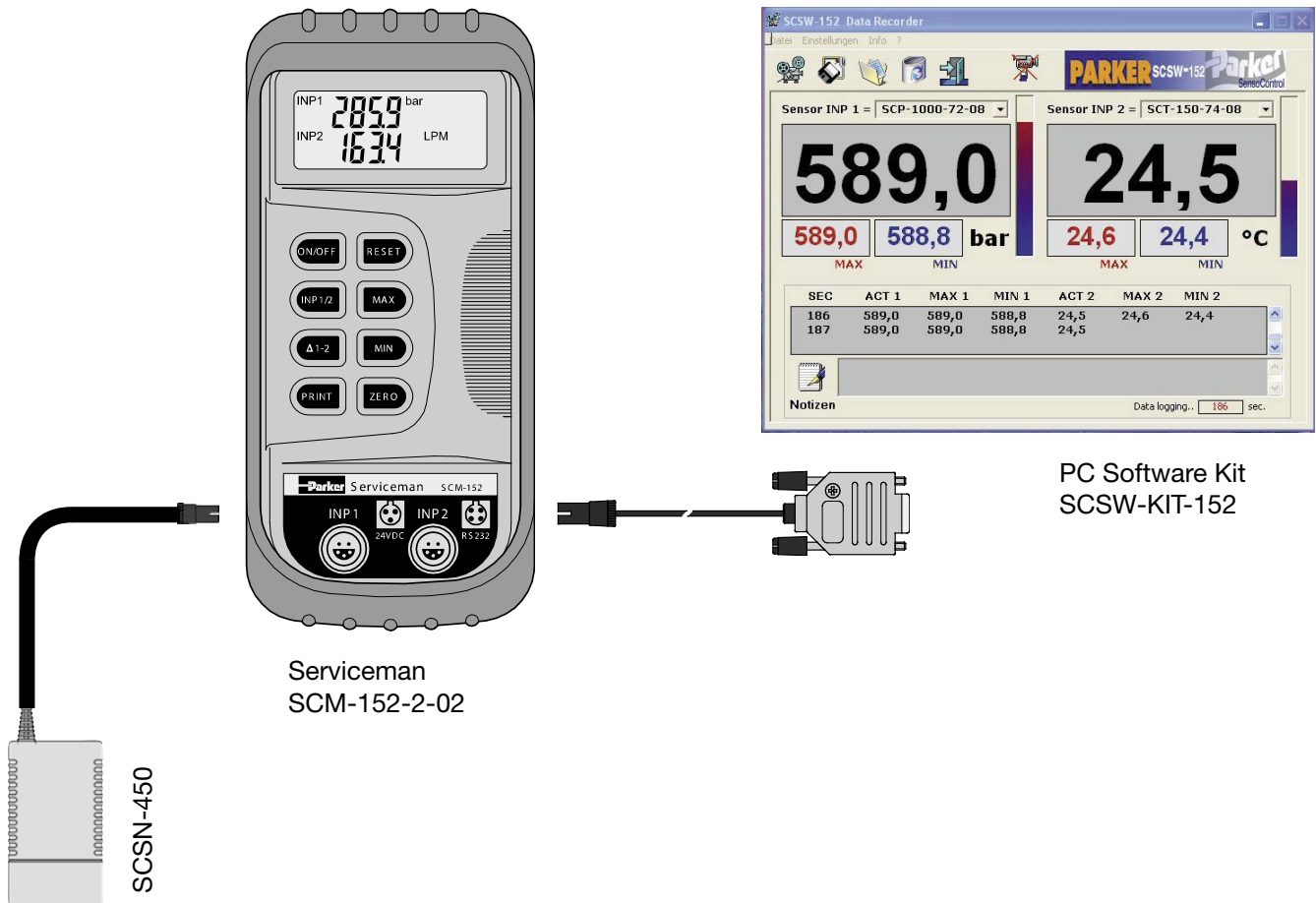
Pressure Sensors

There is a selection of various measuring ranges for pressure measurement. Sensors are available for pneumatic applications and also for measuring pressure peaks up to 1000 bar.

Diagnostic adaptors

All pressure sensors in a measurement case (kit) are provided with a factory-assembled SCA-1/2-EMA-3 diagnostic adaptor. The pressure sensors can be adapted to all standard measuring connections with the help of diagnostic couplings supplied. They are perfectly suitable for a quick and flexible diagnoses in hydraulic applications.





- Easy operation
- Self running installation
- On-line data recording
- Storage of readings in MS Excel format
- Analysis of data with standard software
- Print out readings on site

Data transfer from Serviceman to PC or laptop is possible with the PC Software Kit.

The software included is compatible with MS Windows 98/2000/XP.

Recorded data can be further processed and analysed with standard software (e.g. MS Excel).

- Instruments with 3-channel, 4-channel and 6-channel technology
- Easy operation due to automatic sensor recognition
- PC connection
- Powered by rechargeable battery
- Rugged design



The **Service Master** is a multi-channel hand meter for the simultaneous measuring of important hydraulic values:

All hydraulic parameters such as pressure, differential pressure, flow and hydraulic power can be measured, displayed, stored and processed.

To meet the requirements of both modern industrial hydraulics and complex mobile hydraulics, we offer a range of different models:



Service Master SCM-250 (3 inputs/channels)

Memory capacity = 60,000 MIN and MAX points
 Max. 60 single graphs storable
 (1-channel operation)
 Max. 20 different measurements storable
 (3-channel operation)

Service Master SCM-360 (4 inputs/channels)

Frequency measurement (I3)
 Memory capacity = 125,000 MIN and MAX points
 Max. 120 single graphs storable
 (1-channel operation)
 Max. 30 different measurements storable
 (3-channel operation)

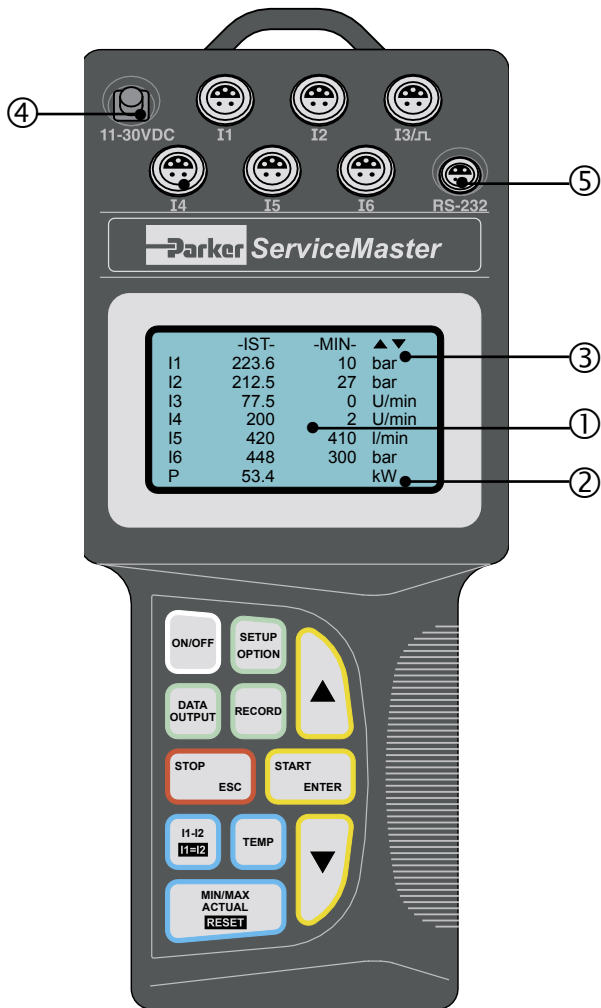
Service Master SCM-400 (6 inputs/channels)

Frequency measurement (I3)
 Memory capacity = 125,000 MIN and MAX points
 Max. 120 single graphs storable
 (1-channel operation)
 Max. 20 different measurements storable
 (6-channel operation)

Service Master SCM-450 (6 inputs/channels)

Frequency measurement (I3)
 Memory capacity = 250,000 MIN and MAX points
 Max. 240 single graphs storable
 (1-channel operation)
 Max. 40 different measurements storable
 (6-channel operation)

	SCM	250	360	400	450
Input	Sensor inputs	3	4	6	6
	With sensor recognition (p/T/Q/n) Adaptor for external sensors with SCMA-VADC Plug-in connection: 5-pin, push-pull Sample rate: ≥ 1 ms = 1,00 measurement values/sec. Resolution: 12 bit + sign = 4,096 steps	●	●	●	●
	Frequency input via input socket I3 for flow turbine or tachometer Frequency range: 0.5 Hz ... 30 kHz Signal input: depends on frequency 5 V _{pp} (max)		●	●	●
Display	Graphic LC Resolution: 128 x 64 pixels Visible area: 72 x 40 mm Automatic adjustment of digit size Digit size: 4.2 mm (for 8 line display) Accuracy of display: < 0,25 % of Full Scale Range	●	●	●	●
	Graphic curve representation	●	●	●	●
Operation	Via 11-key membrane keyboard With mechanical tactile touch and embossed edges	●	●	●	●
Interface	RS232C (4-pin, push-pull) optional with a standard RS232/USB PC adaptor Baud rate: 1,200 ... 38,400.8 data bits, 1 stop bit Online data transmission to the PC Transferring recorded data to PC with SensoWin®	●	●	●	●
Functions	I1-I2 indication of differential values Indication of MIN/MAX/ACTUAL values Indication of TEMP values (SCPT/SCT) Auto power off/battery level control Hydraulic power/outflow volume	●	●	●	●
Measured value memory	Memory capacity (60,000 MIN and MAX points)	●			
	Memory capacity (125,000 MIN and MAX points)		●	●	
	Memory capacity (250,000 MIN and MAX points)				●
	Variable storage interval (e.g. = 10 ms) Number of points per channel (e. g. 4,000 Min-Max) Variable recording time (2 s ... 100 h) Trigger: slope/manual/external/time Pre trigger External trigger with additional device SCMA-TR	●	●	●	●
Ambient conditions	Temperature range: 0 ... +50 °C Storage temperature: -25 ... +60 °C Temperature error: < 0.02 %/ °C Rel. humidity: < 80 % Protection according to DIN 40050: IP 54 (water spray/ oil)	●	●	●	●
Power supply	Internal: NiCd-battery 7.2 V/700 mAh Battery charging circuit Battery service capacity: 5 h approx. External: with SCSN-450 (220/100 VDC) Automotive cable adaptor as equipment (12/24 VDC)	●	●	●	●
Housing	Material: glass ball-reinforced polyamide Dimensions: 235 x 106 x 53 mm (L/W/H) Weight: approx. 530 g	●	●	●	●



- I1 – I6 Sensor inputs with automatic sensor recognition (p/T/Q/n).
External sensors with SCMA-VADC-250
V/A Measuring voltage/current with SCMA-VADC-400
- I3/I4 Frequency input
- ① Graphic LC Display: shows measured values, operation menus and graphs
- ② Additional line:
Indication of hydraulic power or outflow volume
- ③ Status line: shows the actual, min and max values and menu settings
- ④ External power supply via power unit SCSN-450 or automotive cable adaptor
- ⑤ PC interface: RS232
External trigger module with SCMA-TR-250

- ON/OFF Switches the instrument on and off
- SETUP OPTION System settings, date/ time, storage operation
- ▲ ▼ Menu
- START ENTER Start measurements
- STOP ESC Stop measurements
- I1-I2 I1=I2 Differential function I1-I2
Zero point equalisation (Tara-Function) I1=I2
- TEMP SCPT temperature measuring sensors
- DATA OUTPUT Data output to PC or graphic display
On-line test (200 ms)
- RECORD Recording and saving of measurements
(program or start/Stop)
- MIN/MAX ACTUAL RESET ACT-, MIN- und MAX-display
RESET deletes MIN/MAX-values

Order code

Service Master

(Delivery includes
SCSN-450 power unit)

Number of measuring channels	Frequency measuring	MIN and MAX value memory
3	—	60.000 points
4	●	125.000 points
6	●	125.000 points
6	●	250.000 points

SCM-XXX-1-01

250

360

400

450

Automotive cable adaptor 12/24 VDC
SensoWin® PC Software-Kit

SCK-318-05-21
SCSW-KIT-400

The Service Master can be used as a measuring instrument in three different versions:

1. Measuring and readout

Through automatic sensor recognition all measured values are shown immediately on the display. Each input can be used as required. The display switches automatically to the appropriate line size.

■ Peak pressure measurement (MIN/ MAX display)

The scanning rate of 1,000 measurement values/s captures rapidly occurring pressure peaks within the space of a millisecond.

■ Differential pressure measurement

Exact Δp measurement is achieved by means of the Δp adjustment. Under operating pressure the deviation of the pressure sensors relative to each other is corrected. For load sensing control the exact Δp setting is a prerequisite for trouble-free functioning of the hydraulics. A combination of Δp (bar) and flow Q (l/ min) is displayed as hydraulic power P (kW).

■ External sensors

Analogue signals such as those from a force or stroke sensor (external sensor) can also be measured and evaluated with the Service Master. The measurement of electrical currents or voltages (for example proportional valves) up to 1.5 ADC or 48 VDC. External modules make the Service-Master a multifunctional measuring instrument.

SCMA-VADC-250	Signals (0...20 mA or 0...10 VDC)
SCMA-VADC-400	V/A measurement (1,5 ADC or 48 VDC)
SCMA-TR-250	external trigger signal

3. Online Operation

In On-line operation all measurement values are transferred directly from the Service Master to a PC and subsequently stored. The current graphic display in SensoWin® allows the hydraulics to be set (valve position or pressure load) whilst the test is running.

With the SCMA-AO-400 the measurement values are documented as analogue signals (0...20 mA) on an external device (for example, graphic recorder or oscilloscope). The sensor signals can be processed directly by an external A/D converter or PLC control unit.

2. Data logging and recording

The recording (storage) of measurements provides documentation of settings and the actual condition of the hydraulics.

Measurements can be printed or further processed on a PC with SensoWin® software. This is ideal for customer care or service since the measurements can be called up at any time.

With the special storage technology of the Service-Master, all pressure peaks in the hydraulic system can be captured independently of the set measurement time (storage time). The storage interval (time interval between storage points) is automatically adapted within the base setting of the Service Master. Within each storage interval one min. and one max. value is stored. The user has only to pre-select the measuring time (storage time = 100 h. max.).

Individual setting of the storage interval is likewise available (for example, 10 ms).

■ Start-stop function

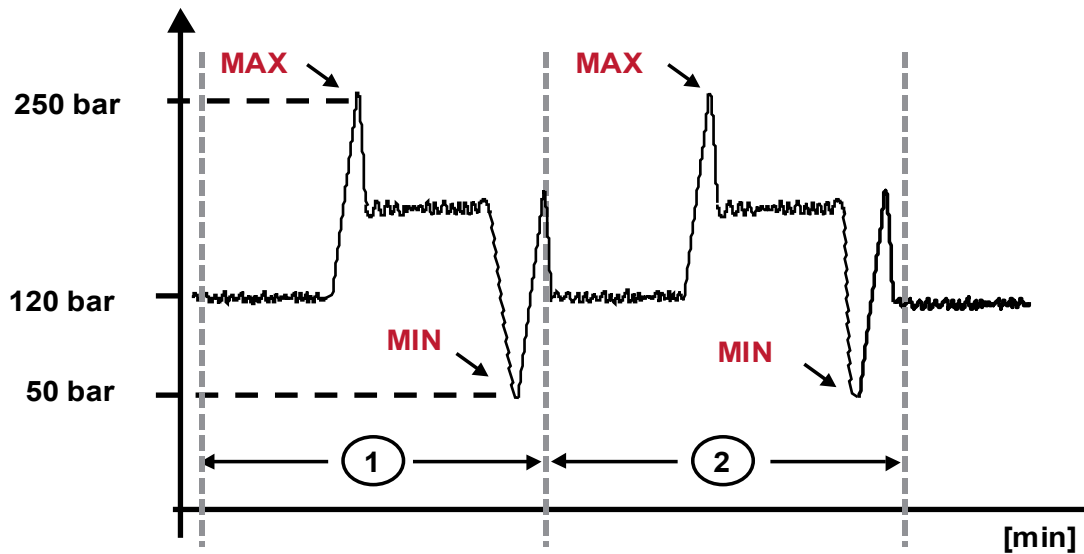
The start and finish of measurements are controlled by the start/stop key only

■ Program-controlled recording

Four programs may be selected:

- Flank trigger
Recording starts by pressure increase (60 bar, increasing slope)
- Manual
Start by pressing enter key
- External trigger
Starts recording by external signal (e.g. relay contact)
- Clock time
Start at e.g. 14.25 h

In each programme the recording time (2s...100 h) and the corresponding start function are selected. All the connected channels (sensors) are measured and stored. Program-controlled storage is particularly advantageous during the search for faults in hydraulic machinery. The point when the cause of damage occurs (for example, pressure peak or pressure drop) is not as a rule foreseeable. With the help of SensoWin® the recording can be subsequently analysed exactly.

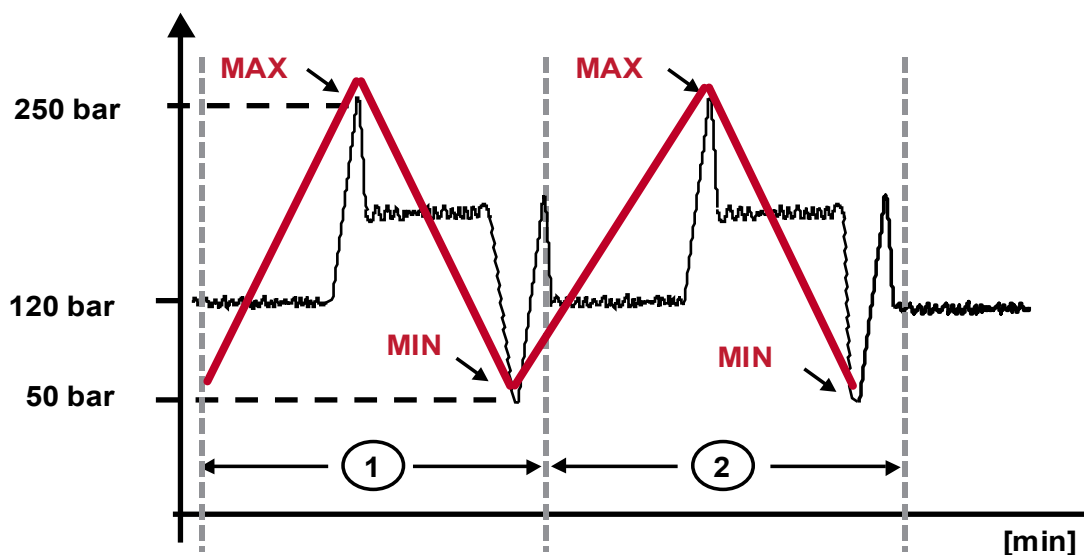


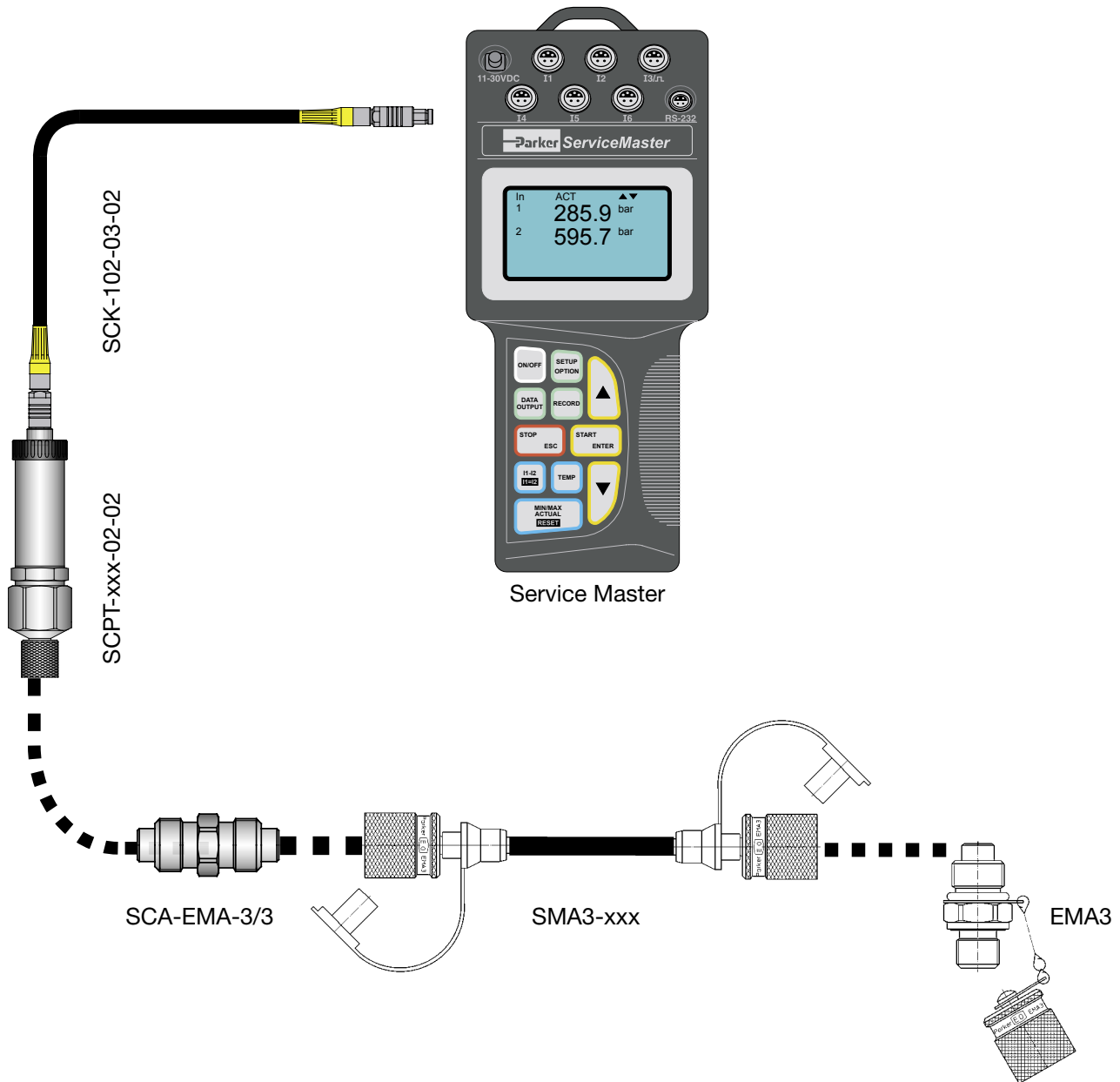
With the Service Master up to 6 sensors can be measured, displayed and recorded simultaneously. Each sensor (channel) enables up to 4,000 memory intervals to be created. Each memory interval will save a pair of data points. The pair consists of one MIN and one MAX reading.

In a recording session of 10 min and 4,000 intervals, the length of each storage interval is 150 ms.

Running a constant scanning rate of 1,000 readings/s this will correspond to 150 readings (interval).

The highest (max) and lowest (min) will be carried to the measurements memory. The connection of these data points creates a measured graph and guarantees the capture of pressure peaks.



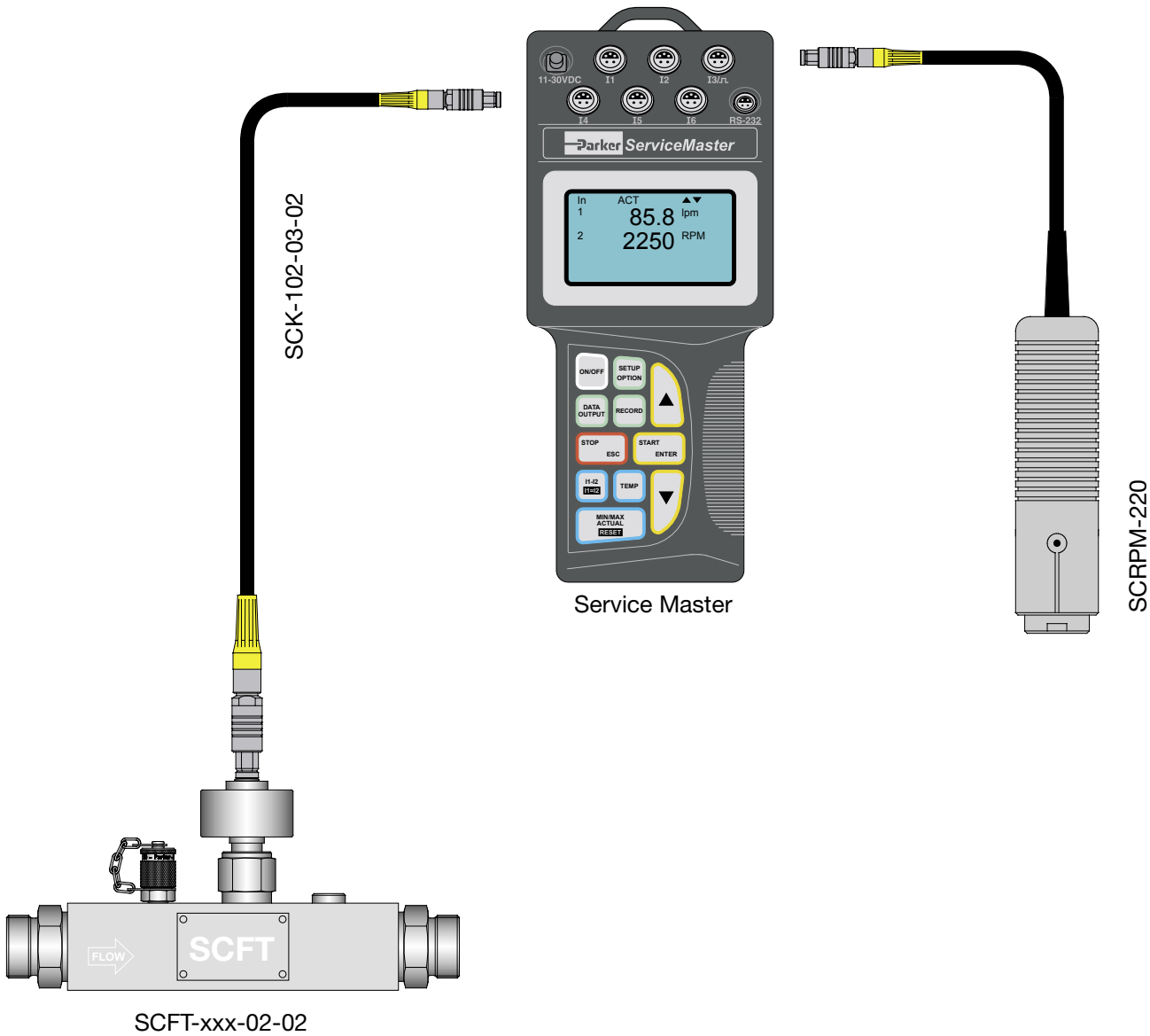


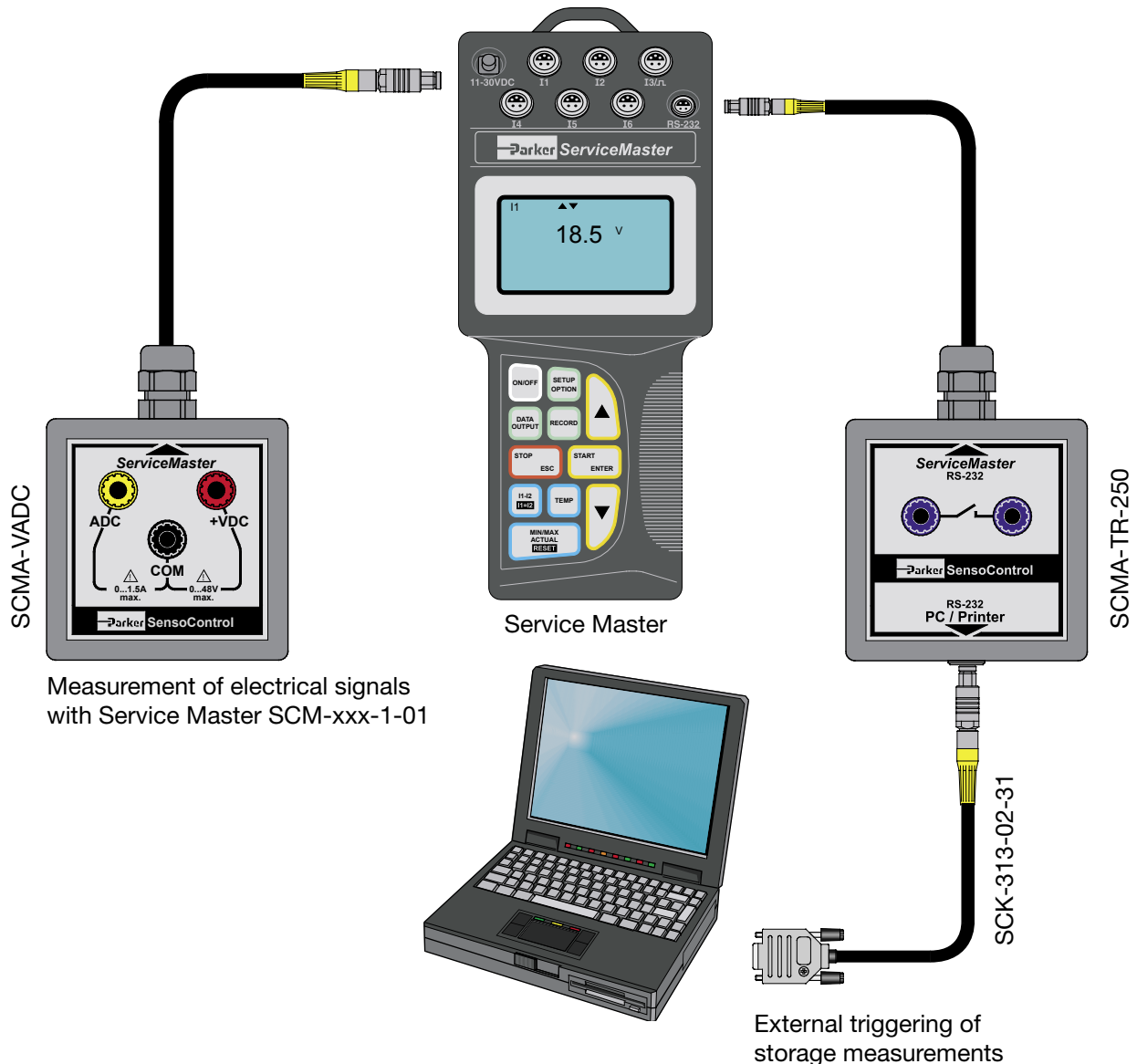
Pressure/Temperature measurement SCPT

There is a selection of various measuring ranges for the measuring of pressures. Sensors can be used for pneumatic applications and also for measuring pressure peaks up to 1000 bar. The pressure/temperature sensors of the SCPT series have a temperature channel which is retrieved via the TEMP key.

Diagnostic adaptors

All pressure sensors in a measurement case (kit) are provided with a factory-assembled SCA-1/2-EMA-3 diagnostic adaptor. The pressure sensors can be adapted to all standard measuring connections with the help of diagnostic couplings supplied. They are perfectly suitable for a quick and flexible diagnoses in hydraulic applications.





■ Measurement of external signals SCMA-VADC-250

Signals such as 0/4...20 mA or 0...10 V from external sensors, for example, for torque, power or stroke, are connected to the Service Master.

Typical applications:

- Power/stroke graphs
- Torque/flow volume nominal lines

■ Current/voltage measurement SCMA-VADC-400

Electric currents up to 1,5 ADC and voltages up to 48 VDC can be measured with this module.

Applications:

- Current consumption of a proportional valve
- Measurement of switch status in motors/pumps

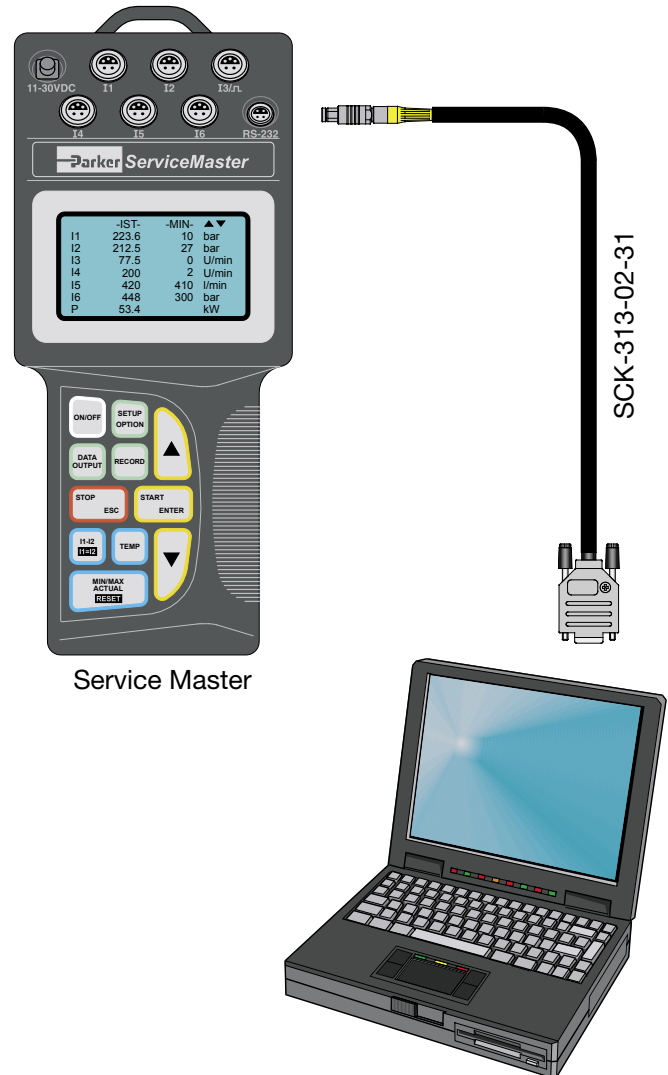
■ SCMA-TR-250

External signals such as relay contacts, for example, can be used as starting signals for measurement recording (storage). The measurement recording begins with the opening of a valve or the start-up of a pump. In order that during on-line measurement the external relay triggering is working, the SCMA-TR-250 is connected directly to the PC.

■ Analogue Output 0...20mA

With the SCMA-AO-400 (not shown) the measurement signals are emitted as analogue signals to external devices. The measurement value is graphically registered on a graphic recorder. The analogue signal can be processed in the hydraulic control as an actual value signal.

- Easy operation
- Windows® 95/98/2000/NT/XP
- Simultaneous representation of 16 curves
- Zoom functions
- Linking of measuring curves
- Tabular listing of measured values
- Calculation of extreme value
- Curve shifting function
- Free selection of units and measuring ranges
- Cursor functions
- Transmission of set-up parameters from the Service Master



Service Master

General

The **SensoWin®** software is an easy to operate software package for reading and processing the measured curves recorded by the **Service Master**.

Documentation and certificates can be created easily and at low cost as **SensoWin®** can make use of all Windows facilities and advantages.

Functions

Up to 16 different curves can be represented in a diagram. The curve shifting function allows exact hydraulics analysis. A power performance curve can be created to evaluate a pump.

Leaks and pressure losses can be detected with the help of the generation of a Δp function. With the cursor, an hydraulic procedure can be examined time-dependent.

For each curve, extensive information is provided, i.e. the **Service Master** measurements can be reproduced at any time. The change of the ranges and units allows later adjustment for presentation in a diagram.

Tabular presentation of MIN and MAX values, smoothing of the measurement curve and mathematical links are important functions in the analysis of the hydraulic system.

Date and time are documented with each measurement. This considerably facilitates later allocation of values.

Direct transmission of measured values from the **Service Master** to the PC is also possible.

Current events (pressure peaks, etc.) are visible while the process is running (on-line function).

- Robust stainless steel design
- Response times of 1 ms
- Capturing of pressure peaks
- Accuracy $\pm 0,25$ % typ.
- Flexible operation
- SCPT sensors with 5 pin socket for Serviceman/Service Master



Fast response times guarantee the safe capture of pressure peaks in hydraulic systems. The robust stainless steel construction allows a variety of applications, for example cooling water or pneumatics.

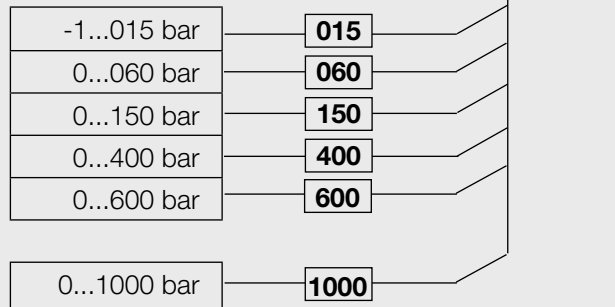
All pressure sensors are delivered with a diagnosis adaptor (M16x2) installed. Connection to the hydraulic system takes place quickly and safely. Times for installation are reduced.

Pressure Range	Applications
-1...015 bar	Pneumatics/ low pressure
0...060 bar	Medium pressure
0...150 bar	Medium pressure
0...400 bar	Operating pressure hydraulics
0...600 bar	High pressure
0 ... 1000 bar	High pressure peaks
Temperature Range	
-25...+105°C	Oil temperature

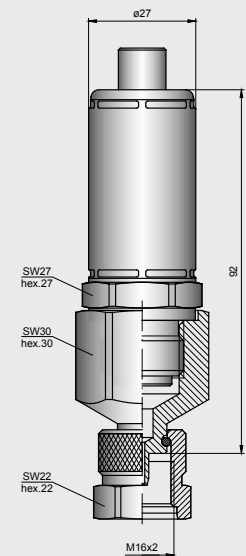
Serviceman/Service Master**SCPT
Pressure/Temperature
Sensor**

with push-pull connector
(5 pin)
+ SCA-1/2-EMA-3

+ SCA-1/2-EMA-3-HP



Connection cable	#
Serviceman (4 pin) 2 m	SCK-102-02-08
Serviceman/Service Master (5 pin) 3 m	SCK-102-03-02
Extension 5 m	SCK-102-05-12

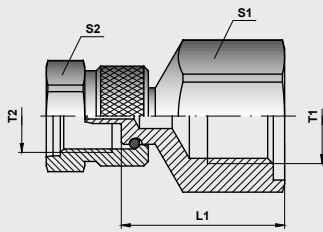
**SCPT-xxx-02-02**

#	SCPT-015	SCPT-060	SCPT-150	SCPT-400	SCPT-600	SCPT-1000
Pressure Measuring Range (bar)	-1...015	0...060	0...150	0...400	0...600	0...1.000
Accuracy (\pm %) FS	typ.	0,25	0,25	0,25	0,25	0,25
	max.	0,5	0,5	0,5	0,5	0,5
Overload Pressure P_{max} (bar)	30	120	300	800	1.200	1.200
Burst Pressure (bar)	150	500	900	1.200	1.800	2.500
Temperature Measuring Range (°C)	-25...+105	-25...+105	-25...+105	-25...+105	-25...+105	-25...+105
Accuracy (\pm 1,5 %) FS						

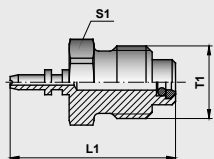
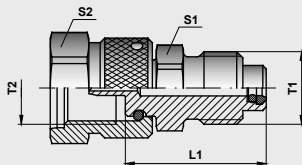
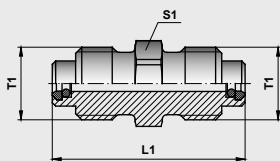
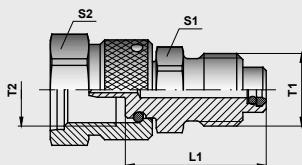
FS = Full Scale Range

Response Time (ms)	1
Pressure Port	1/2" BSPP
Housing	Stainless Steel 1.4301
Weight (g)	200
Seal	Viton® (FKM)
Parts in Contact with Media	Stainless Steel 1.4301 Viton® (FKM)

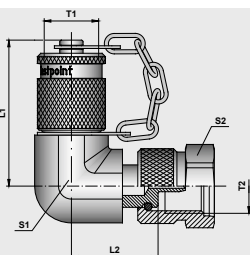
Ambient Temperature Range (°C)	-25...+80
Storage Temperature Range (°C)	-20...+80
T_{max} Fluid (°C)	+105
Reliability Cycles (10^6)	100
Shock Load	IEC 68-2-29
Vibration Resistance	IEC 68-2-6 10...500 Hz


Diagnostic adaptor

#	PN	T1	T2	L1	S1	S2
SCA-1/4-EMA-3	1000 bar	1/4 BSPP	M16x2	32	27	22
SCA-1/2-EMA-3	630 bar	1/2 BSPP	M16x2	36	30	22
SCA-1/2-EMA-3-HP	1000 bar	1/2 BSPP	M16x2	36	32	22


SCA-EMA-3/1

SCA-EMA-3/2

SCA-EMA-3/3

SCA-EMA-3/4
Diagnostic couplings

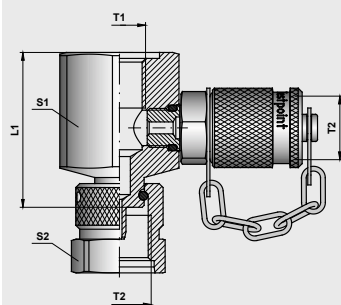
#	PN	T1	T2	L1	S1	S2
SCA-EMA-3/1	630 bar	M16x2	--	37	17	--
SCA-EMA-3/2	630 bar	M16x2	S12x1.65	31	17	17
SCA-EMA-3/3	630 bar	M16x2	M16x2	43	17	--
SCA-EMA-3/4	630 bar	M16x2	M16x1.5	31	17	17


90° Diagnostic adaptor with coupling

#	PN	T1	T2	L1	L2	S1	S2
SCA-90-EMA-3	630 bar	M16x2	M16x2	49	26	19	22

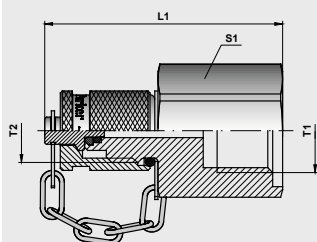


Please pay attention to pressure range

**90° Twin connector, ventable SMA3**

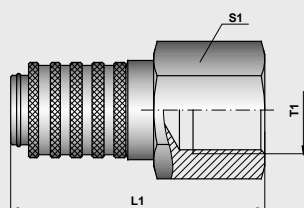
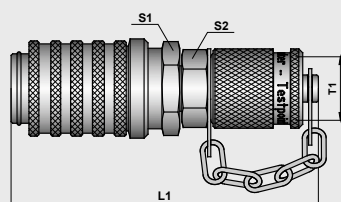
#	PN	T1	T2	L1	S1	S2
SCA-1/4-EMA-3-EL	630 bar	1/4 BSPP	M16x2	39	30	22
SCA-1/2-EMA-3-EL	630 bar	1/2 BSPP	M16x2	42	36	22

- 90° elbow connector with VSTI (see catalogue 4100)
- Δp -adjustment for exact differential pressure measurement
- Venting of hydraulics with SMA3 (see catalogue 4100)

**Sensor connections for hose**

#	PN	T1	T2	L1	S1	S2
SCA-1/4-EMA-3-S	630 bar	1/4 BSPP	M16x2	54	24	--
SCA-1/2-EMA-3-S	630 bar	1/2 BSPP	M16x2	60	30	--

- SMA-3 diagnostic hose (see catalogue 4100)

**SCA-1/2-PQC****SCA-EMA-3/PD****Parker Diagnostic quick couplings**

#	PN	T1	T2	L1	S1	S2
SCA-1/4-PQC	400 bar	1/4 BSPP	--	--	--	--
SCA-1/2-PQC	400 bar	1/2 BSPP	--	64	30	--
SCA-EMA-3/PD	630 bar	M16x2	--	78	21	17

**Please pay attention to pressure range**

PN (bar)	630
P_{max} (bar)	800
Burst pressure (bar)	1.200

PN (bar)	1.000
P_{max} (bar)	1.200
Burst pressure (bar)	2.000

5 Temperature Measurement

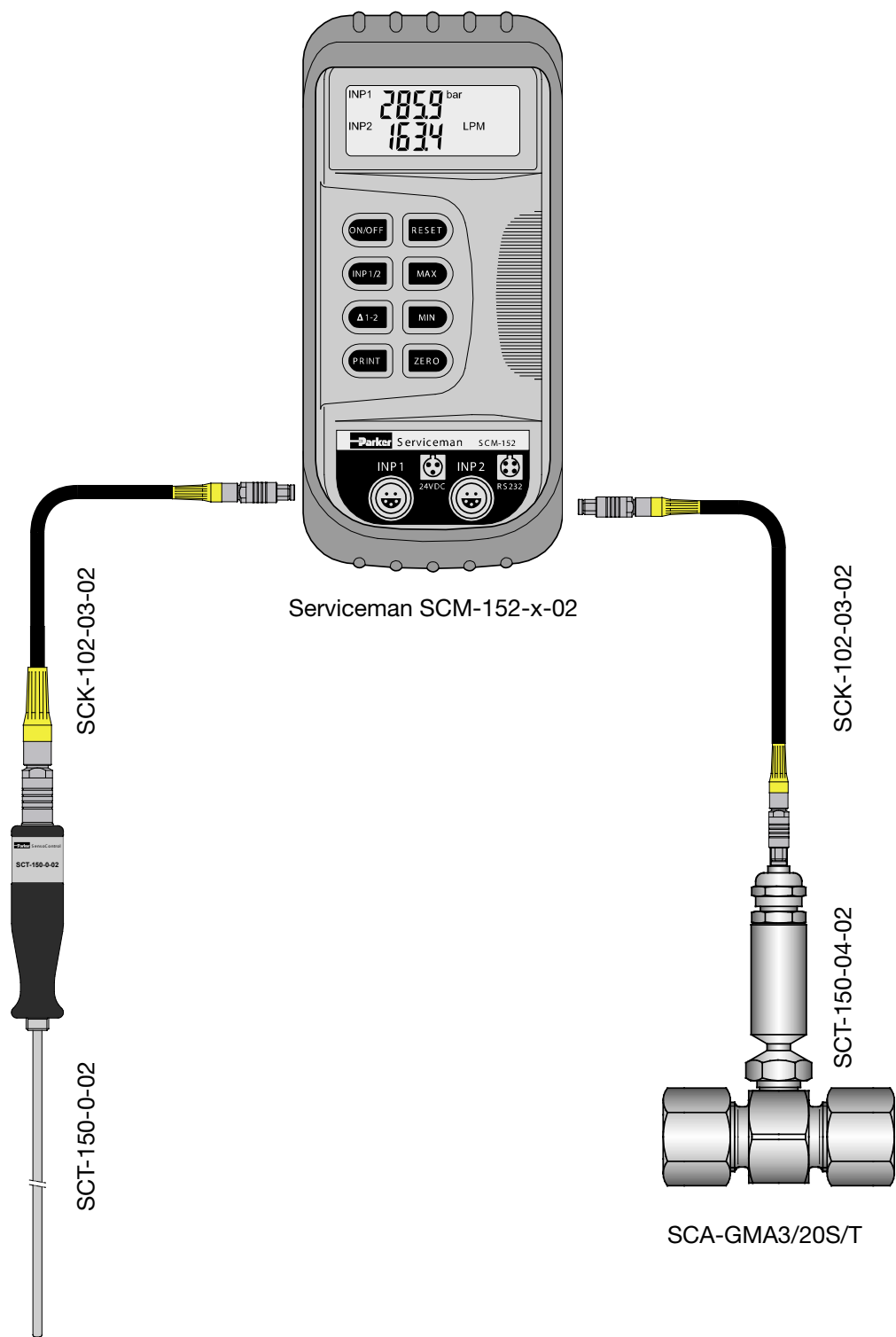
- High pressure-proof temperature sensor
- Measurement of oil temperatures up to 125 °C
- Flexible operation
- Screw-in or manual sensor
- Screw-in sensor with socket for Serviceman and Service Master

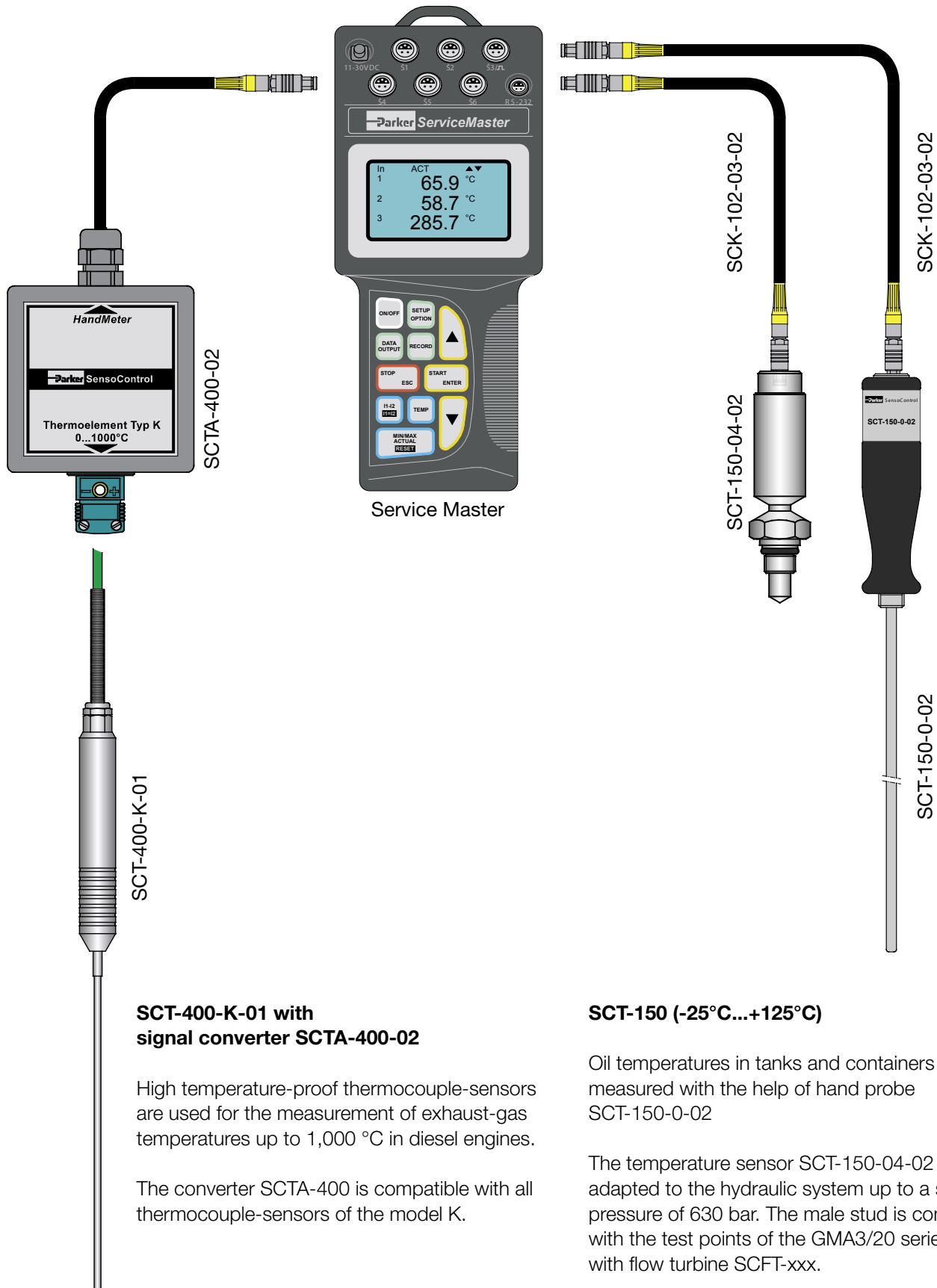


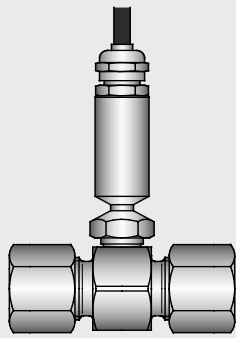
In hydraulics, temperature measurements serve to locate faults and avoid the kind of damage caused by excessive oil temperatures in critical parts such as pumps and proportional valves.

To get the exact temperature, the measurement is done directly in the tube or hose line.

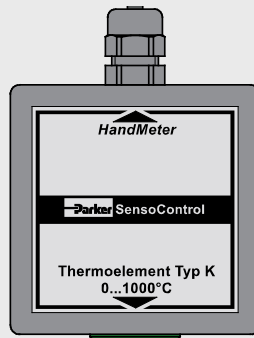
The screw-in sensors SCT-150 are compatible with flow measurement turbines SCFT-xxx-02-02.







IN-LINE Sensor
SCT-150-04-02
with IN-LINE adaptor



Signal converter
SCTA-400-02



Handprobe
SCT-150-0-02



SCT-400-K-01

SCT IN-LINE Sensor M10x1	#
SCT-150 with female connector (5 pin)	SCT-150-04-02
IN-LINE adaptor with M10 port	SCA-GMA3/20S/T

SCT-150 IN-LINE Adaptor Tube assembly (5 pin)	SCT-150-0-02
---	--------------

Connection cables SCT-150-04-02/SCT-150-0-02	#
Serviceman (4 pin) 2 m	SCK-102-02-08
Serviceman/Service Master (5 pin) 3 m	SCK-102-03-02
Extension 5 m	SCK-102-05-12

	SCT-150-04-02	SCT-150-0-02	SCT-400-K-01	SCTA-400-02
Measuring Range (°C)	-25...+125	-25...+125	0...+1.000	0...+1.000
Accuracy	± 1,5°C	± 1,5°C	± 1,5°C	± 1,0%FS
Response Time T _{0,9} (sec.)	13,5	9,1	≤ 5	-
Ambient Temperature (°C)	-25...+70	-25...+70	-20...+150	0...+50
Storage Temperature (°C)	-25...+80	-25...+80	-20...+80	-25...+60
T _{max} (°C)	+125	+125	-	-
Operating Pressure (bar)	630	-	-	-
P _{max} (bar)	630	-	-	-
Burst Pressure (bar)	1.200	-	-	-
Housing	Steel C15K galvanized	Probe: Stainless Steel 1.4304 Grip: Delrin	Stainless Steel	ABS
Seal	Viton® (FKM)	-	-	-
Weight (g)	100	120	150	-
Parts in Contact with Media	Steel C15K galvanized Viton® (FKM)	Stainless Steel 1.4304	Stainless Steel	-

FS = FullScale

6 Determination of Flow Volume

Depending on the measurement job to be done, various measuring instruments are available to the hydraulic technician:

1 Flow meter type SCQ

- Flow measurement with direction indication
- Very fast reaction time < 2 ms
- Wide viscosity range
- Screw-in cartridge in connector block SCAQ

2 Turbine flow meter type SCFT

- Very low flow resistance
- Built-in measurement points for pressure and temperature
- Very simple installation into a hydraulic system
- 6 different measuring ranges up to 750 l/min.
- Recording of a p/Q characteristic curve with a load valve to determine hydraulic performance

3 Gear flow meter type SCVF

- High precision flow measurement over a wide range of viscosity
- 4 measuring ranges up to 300 l/min.
- flexible use with various fluids



In addition to pressure measurement, the precise determination of flow volume in hydraulic equipment gives important evidence of the condition of the hydraulics. The efficiency of hydraulic drives such as hydrostatic units or variable pumps depends on the amount of flow. Hydraulic performance is determined by pressure and flow. The degree of wear in a hydraulic drive can be ascertained by comparing nominal and actual values. The resulting measurements can be used, for example, in preventive maintenance for systematic servicing and cost reductions. In mobile hydraulics, the efficiency of the machine is continually checked and documented. The diagnosis of pressure and flow thereby gives a total analysis.

- **Measurement principle:**
spring/piston system
- **Flow measurement with**
direction indication
- **Response time** < 2 ms
- **Compact design**
- **Withstands pressures up to 420 bar**
- **Wide range of viscosity**
- **p/T/Q measurement possible**
with connection block



Flow measurement with direction indication for mobile and stationary measurement jobs

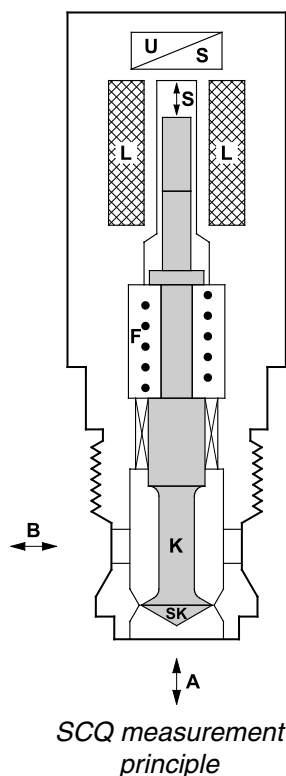
Function

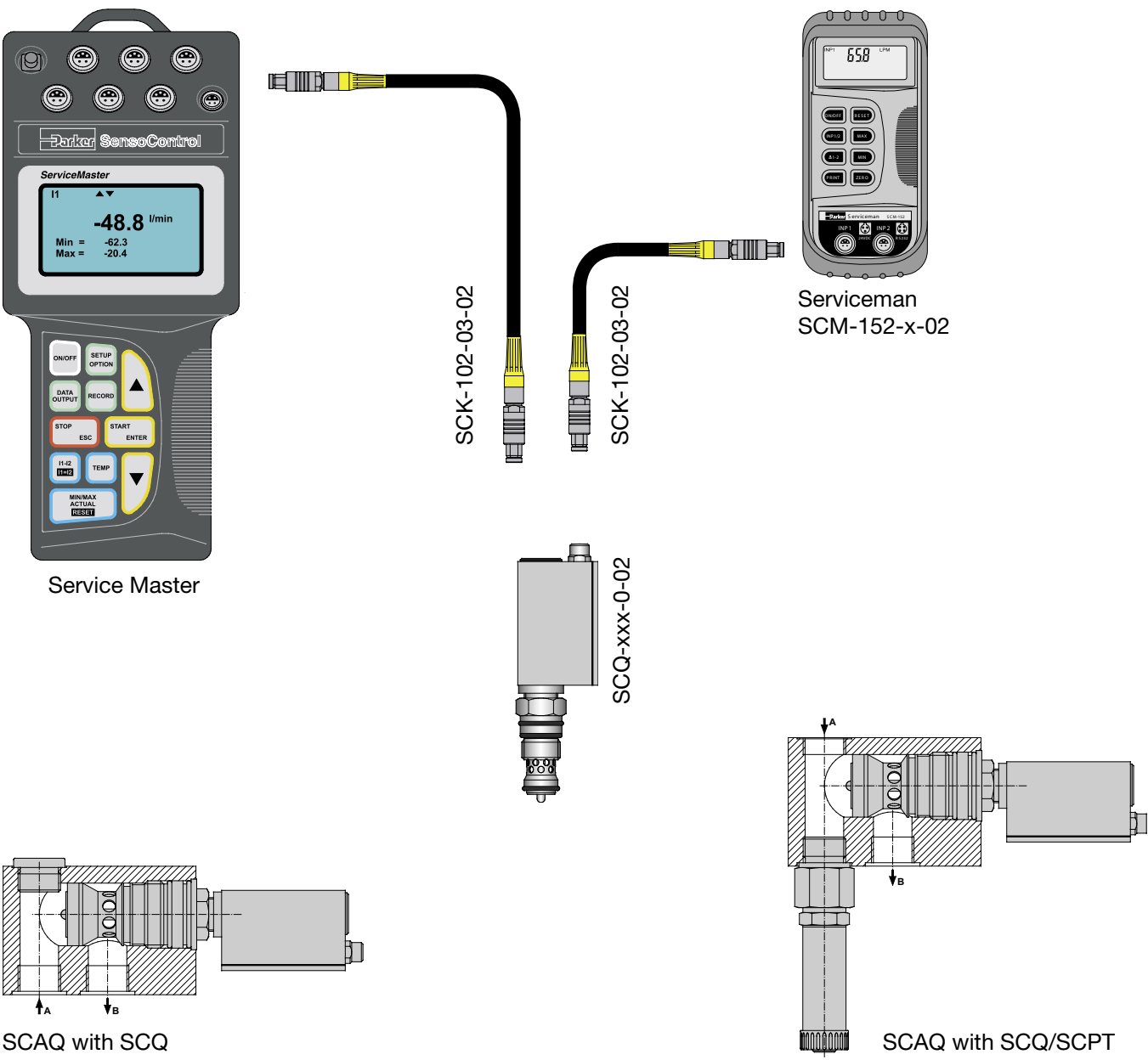
When there is a flow from A to B or B to A, the piston (K) is moved. When at rest, the spring (F) and piston (K) are in equilibrium. The stroke change (S) is proportional to the flow volume and is converted by the built-in electronics to a measured value. By the change in direction of the piston (B to A) flow directions can be shown (e.g. -45.8 l/min.). The response time of the piston movement is less than 0.002 s.

Application

In the field of high pressure hydraulics, the rapid capture of the amount of flow is of great significance. The reaction times of the SCQ's enable the dynamic behaviour of hydraulic systems to be measured. The indication of direction is helpful when searching for faults in hydraulic systems. Rapid load changes, which can cause damage for example in valves and pumps, can be determined. Installation with a connection block permits the combined measurement of p, T and Q. Rapid assembly of the SCQ's is achieved with an in-line adaptor for tube or hose installation.

Robust design makes possible extreme condition applications, such as, for example, high load changes or rates of pressure increase.





SCQ	#
0...60 l/min	SCQ-060-0-02
0...150 l/min	SCQ-150-0-02
(flow direction indication with Service Master only)	

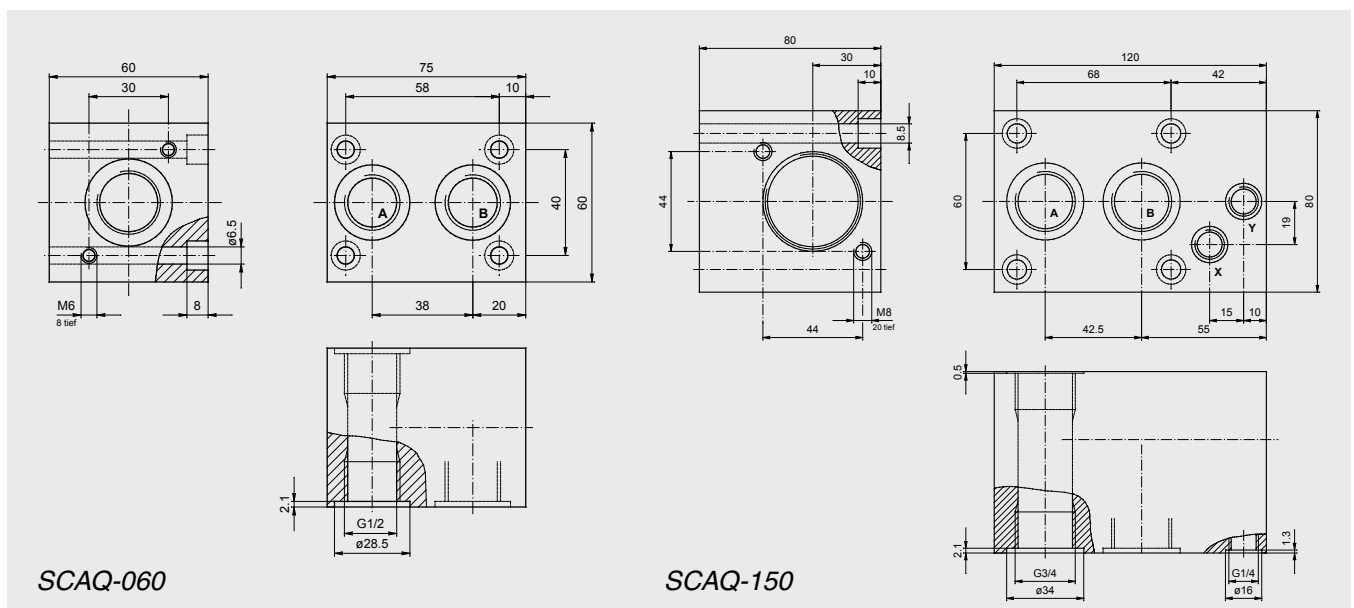
Connection Cables	#
Serviceman (4 pin) 2 m	SCK-102-02-08
Serviceman/Service Master (5 pin) 3 m	SCK-102-03-02
Extension 5 m	SCK-102-05-12

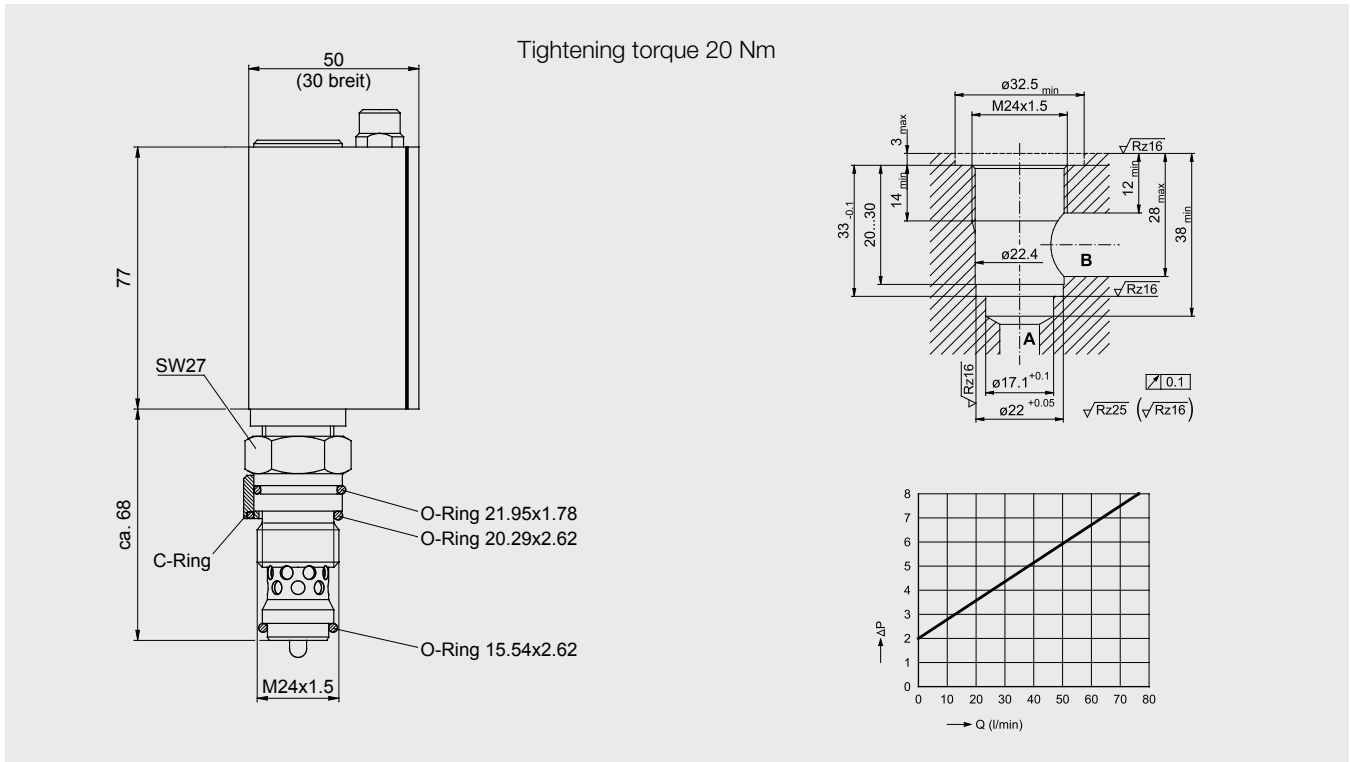
#	SCQ-060	SCQ-150
Flow Range QN (l/min)	-60...+60	-150...+150
Accuracy (± %) FS @ 46cSt.	2,0	2,0
Operating Pressure PN (bar)	315	315
Ports	M24 (NG10)	M42 (NG16)
Pressure Drop P _{max} (bar) @ (FS)	Graphs	
Weight (g)	670	1050

FS = FullScale

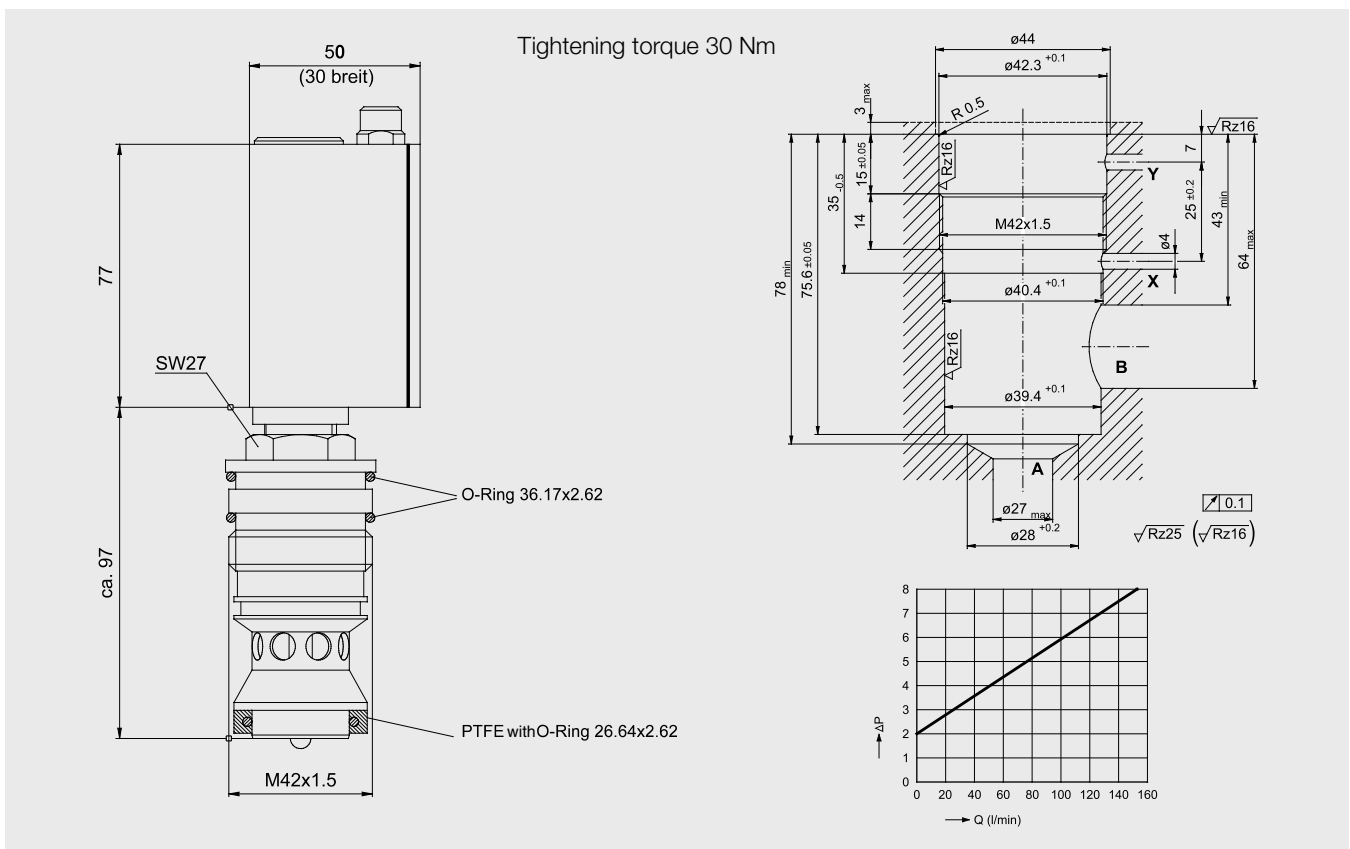
Response Time (ms)	2	Ambient Temperature (°C)	+10...+60
Q _{max} (l/min)	QN x 1,1	Storage Temperature (°C)	-20...+80
Overload Pressure P _{max} (bar)	420	T _{max} Fluid (°C)	+80
Housing	Steel	Filtration (µm)	25
Sealing	NBR	Viscosity Range (cSt.)	15...100
Parts in Contact with Media	Steel, NBR		

#	SCAQ-GI-R-1/2	SCAQ-060	SCAQ-150
Ports (SCQ)	M24 (NG10)	M24 (NG10)	M42 (NG16)
Ports (A - B)	1/2" BSPP	1/2" BSPP	3/4" BSPP





Port dimensions and pressure drop graph SCQ-060



Port dimensions and pressure drop graph SCQ-150

- **Measurement principle:**
flow turbine
- **6 flow ranges up to 750 l/min**
- **Simple installation**
- **Resistant to high pressure**
up to 480 bar
- **Low flow resistance**
- **Built-in pressure and temperature measurement points**
- **Suitable for reverse operation**



Flow measurement with low flow resistance combined p/T/Q measurement

Function

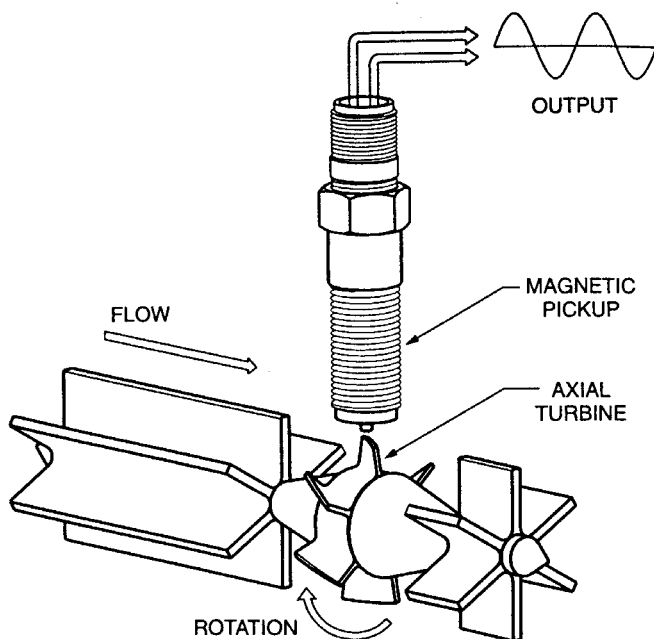
A turbine wheel is driven by the oil flow. The frequencies thus produced are processed by digital electronics. The influence of turbulent flow effects is compensated for.

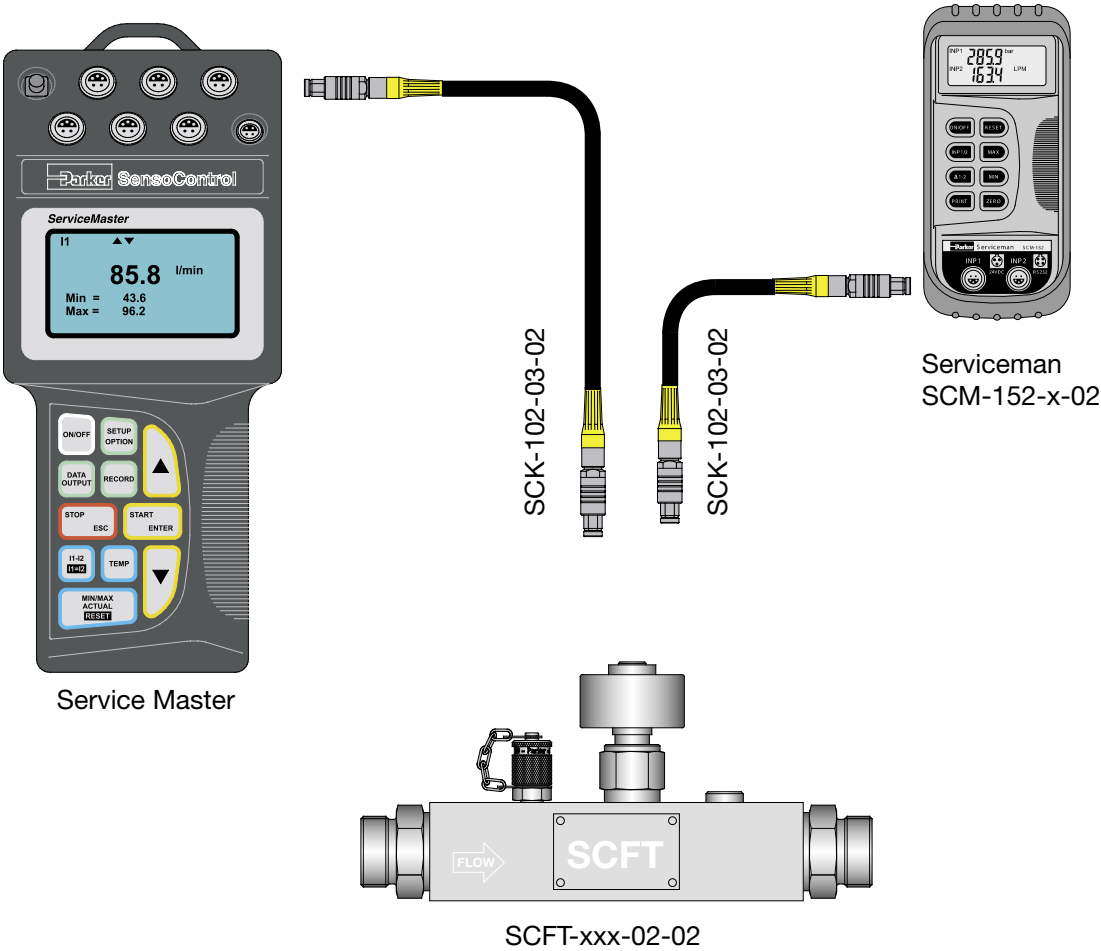
Because of the low flow resistance Q_R the hydraulic circuit operates with very low losses. For pressure measurement the turbine is equipped with an EMA-3 test point.

Oil temperatures are measured direct in the oil flow. Consequently all the important measurement parameters are available at one measuring location.

Applications

- mobile diagnosis (SCFT with SCM)
- p-Q measurement in construction and agricultural machines
- hydraulic tests with load valves
- automatic scaling





SCFT Serviceman/Service Master	#
1 ... 015 l/min	SCFT-015-02-02
4 ... 060 l/min	SCFT-060-02-02
6 ... 150 l/min	SCFT-150-02-02
10 ... 300 l/min	SCFT-300-02-02
20 ... 600 l/min	SCFT-600-02-02
25 ... 750 l/min	SCFT-750-02-02

Connection Cables	#
Serviceman (4 pin) 2 m	SCK-102-02-08
Serviceman/Service Master (5 pin) 3 m	SCK-102-03-02
Extension 5 m	SCK-102-05-12

6.2 Determination of Flow Volume

Turbine Flow Meter

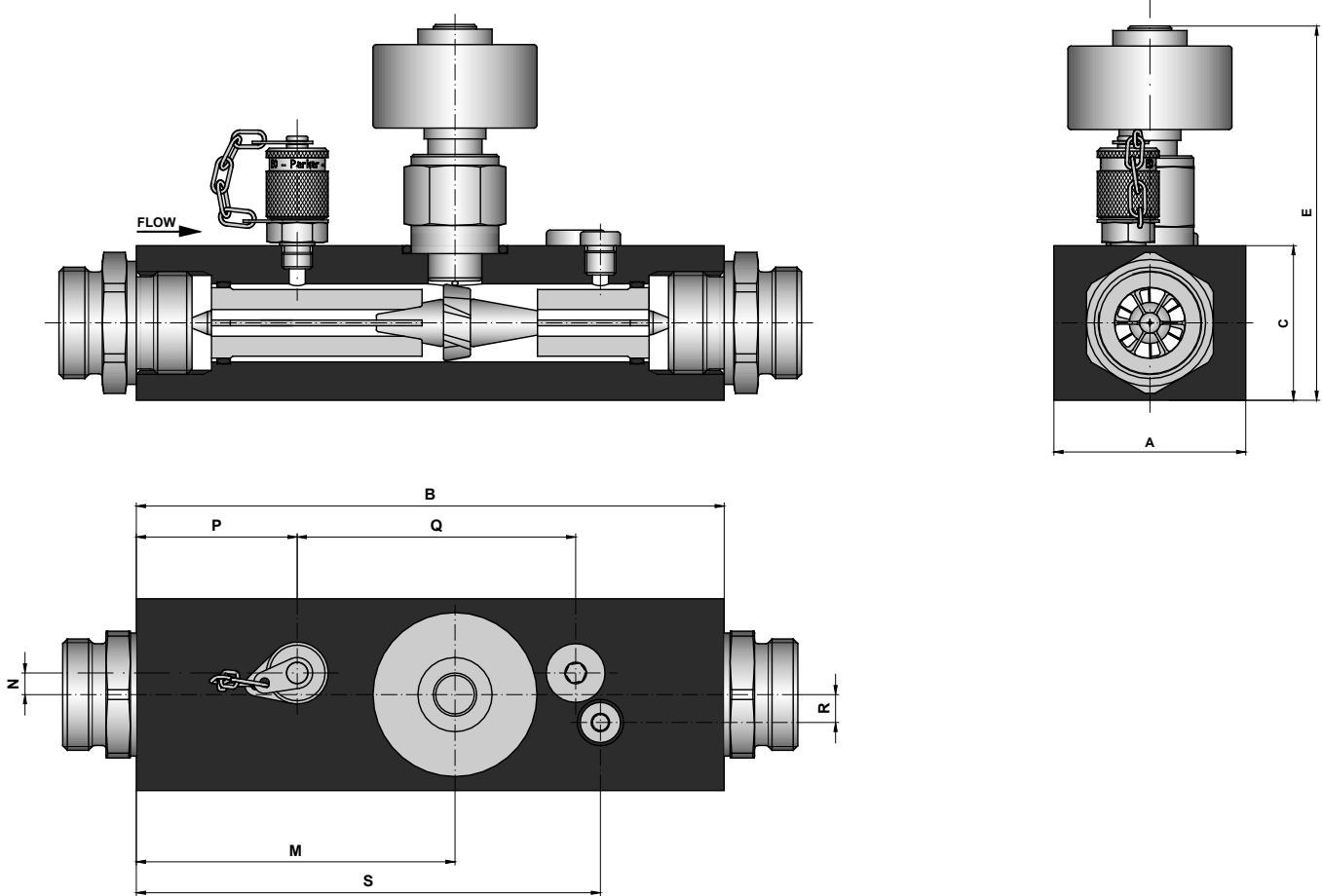
#	SCFT-015	SCFT-060	SCFT-150	SCFT-300	SCFT-600	SCFT-750
Flow Range QN (l/min)	1...015	4...060	6...150	10...300	20...600	25...750
Accuracy (± %) FS/IR @ 21cSt.	1,0 FS	1,0 IR	1,0 IR	1,0 IR	1,0 IR	1,0 IR
Operating Pressure PN (bar)	420	420	420	420	350	480
Ports (A - B)	1/2" BSPP	3/4" BSPP	3/4" BSPP	1" BSPP	1-1/4" BSPP	1-7/8" UNF
Pressure Drop ΔP_{max} (bar) @ (FS)	1,5	1,5	1,5	4	4	5
Weight (g)	650	750	750	1200	1800	2100

FS = FullScale

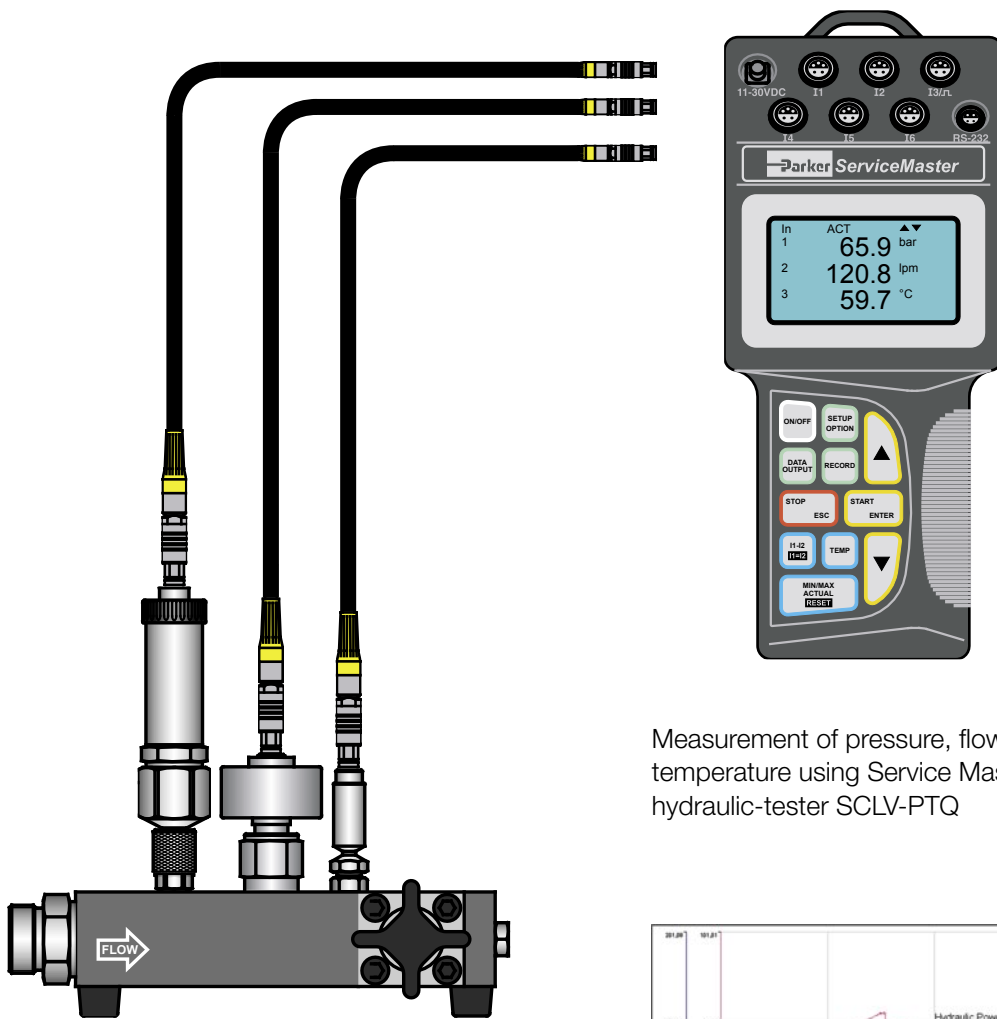
IR = Indicated Reading

Response Time (ms)	50
Q_{max} (l/min)	QN x 1,1
Overload Pressure P_{max} (bar)	PN x 1,2
Ports: Temperature Port (SCT-150) Pressure Port (EMA3 Fitting) Pressure Port (VSTI)	M10x1 OR M16x2 1/4" BSPP
Housing	Aluminium
Sealing	Viton® (FKM)
Parts in Contact with Media	Aluminium, Steel, Viton® (FKM)

Ambient Temperature (°C)	+10...+60
Storage Temperature (°C)	-20...+80
T_{max} Fluid (°C)	+80
Filtration (µm)	25
Viscosity Range (cSt.)	15...100

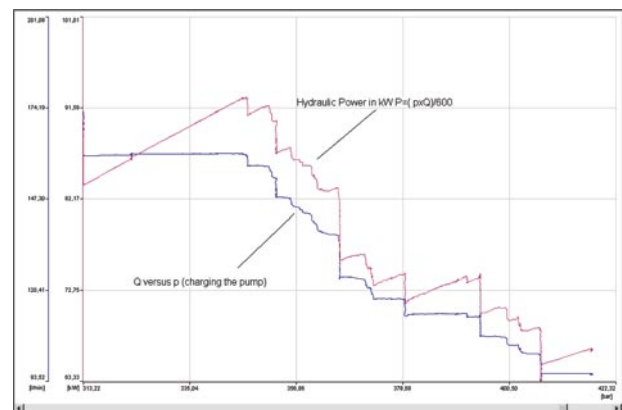
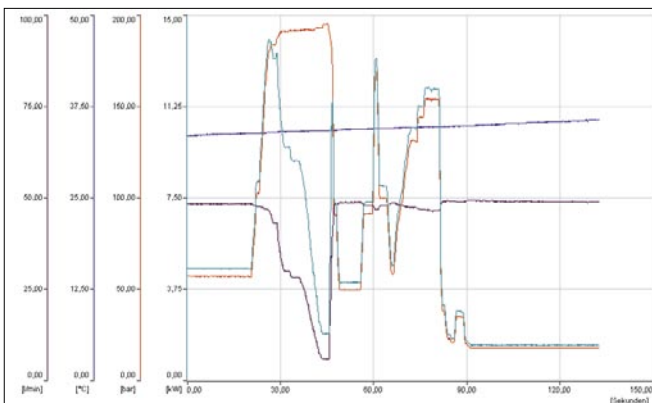


#	SCFT-015	SCFT-060	SCFT-150	SCFT-300	SCFT-600	SCFT-750
A	37	62	62	62	62	100
B	136	190	190	190	212	212
C	37	50	50	50	75	75
E	117	130	130	134	150	154
M	70	103	103	103	127	126
N	0	5	5	7	9	10
P	25	50	50	52	62	60
Q	N/A	92	92	90	106	104
R	0	5	5	9	11	10
S	115	157	157	150	168	181



Measurement of pressure, flow and temperature using Service Master and hydraulic-tester SCLV-PTQ

The p-Q diagram (to the right) shows the power determined. Especially in hydraulic pump (load sensing) systems the speed-dependent load is important to analyze. The evaluation in **SensoWin®** will be done quickly and simply.



The hydraulic power of a system can be analyzed by a combined measurement of pressure and flow (to the left). The diagram shows an application with a hydraulic-tester SCLV-PTQ. Pressure in the system is generated by the integrated loading valve.

In the evaluation power will be calculated from the flow volume and pressure of the pump.

#	SCFT-150-DRV	SCLV-PTQ-300	SCLV-PTQ-600	SCLV-PTQ-750
Flow Range QN (l/min)	6...150	10...300	20...600	25...750
Accuracy (± %) IR @ 21cSt.	1,0	1,0	1,0	1,0
Operating Pressure PN (bar)	420	420	420	480
Ports (A - B)	3/4" BSPP	1" BSPP	1-7/8" UNF	1-7/8" UNF
Pressure Drop P_{max} (bar) @ (FS)	15	4	5	5
Weight (kg)	4,2	5,5	8,9	8,9

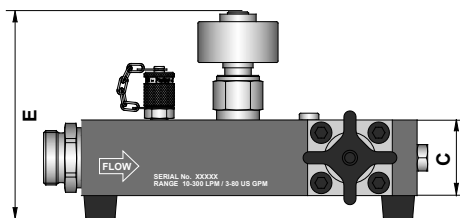
FS = FullScale

IR = Indicated Reading

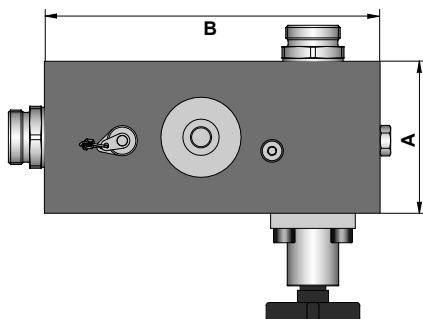
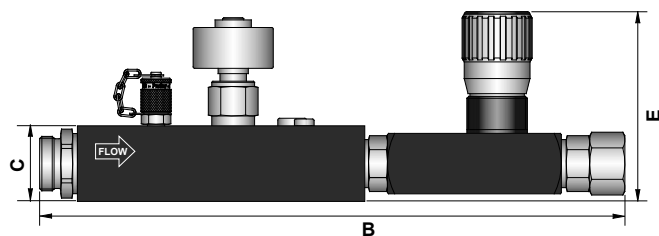
Response Time (ms)	50
Q_{max} (l/min)	QN x 1,1
Overload Pressure P_{max} (bar)	PN x 1,2
Ports: Temperature Port (SCT-150) Pressure Port (EMA3 Fitting) Pressure Port (VSTI)	M10x1 OR M16x2 1/4" BSPP
Housing	Aluminium
Sealing	Viton® (FKM)
Parts in Contact with Media	Aluminium, Steel, Viton® (FKM)

Ambient Temperature (°C)	+10...+50
Storage Temperature (°C)	-20...+80
T_{max} Fluid (°C)	+110
Filtration (µm)	25
Viscosity Range (cSt.)	10...90

SCLV-PTQ-xxx



SCFT-150-DRV



#	SCLV-PTQ-300	SCLV-PTQ-600 SCLV-PTQ-750	SCFT-150-DRV
A	98	117	62
B	222	235	370
C	50	75	50
E	135	150	130

- **Measurement principle:**
volume counter/positive displacement
- **4 flow ranges up to 300 l/min**
- **Measurement accuracy $\pm 0.5\%$ FS**
- **Withstands pressures up to 400 bar**
- **High viscosity range**
- **Low noise emission**



Gear flow for the precision measurement of flow in hydraulic equipment

Function

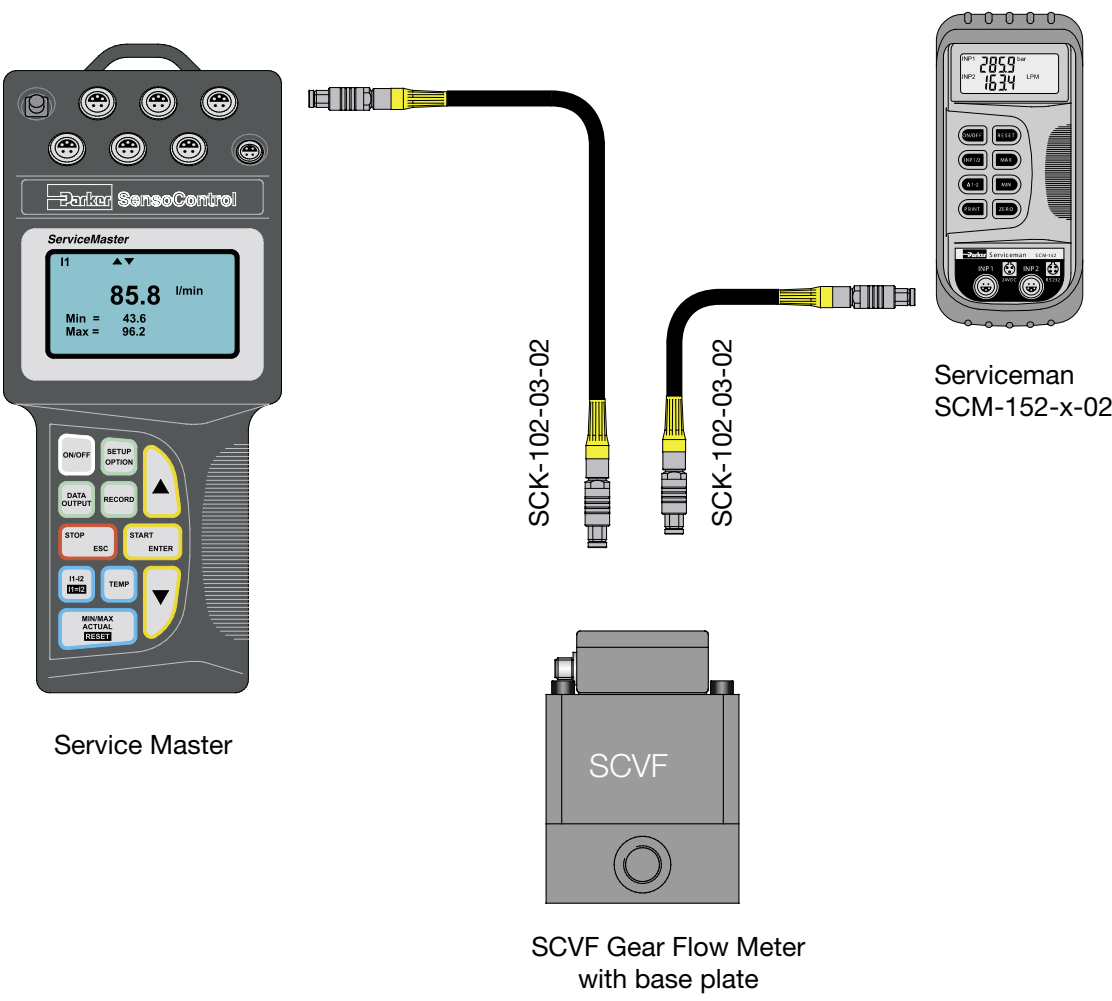
The **SCVF** gear flow meter operates as a flow volume counter. A very precisely machined pair of gears is driven by the fluid flow.

The **SCVF** accommodates a wide range of viscosity. Various seals* permit a large number of applications.

Applications

Because of the wide viscosity range, all fluids which can be pumped and have a certain lubricating capability can be measured.

- brake fluids (EPDM Sealing)
- Skydrol
- mineral oils
- hydraulic oils
- fats
- mobile diagnosis (SCVF with SCM)
exact Q measurement (oil leakage)
automatic scaling (sensor recognition)



SCVF Serviceman/Service Master	#
0,1 ... 015 l/min	SCVF-015-00-02
0,4 ... 060 l/min	SCVF-060-00-02
0,4 ... 150 l/min	SCVF-150-00-02
1,0 ... 300 l/min	SCVF-300-00-02

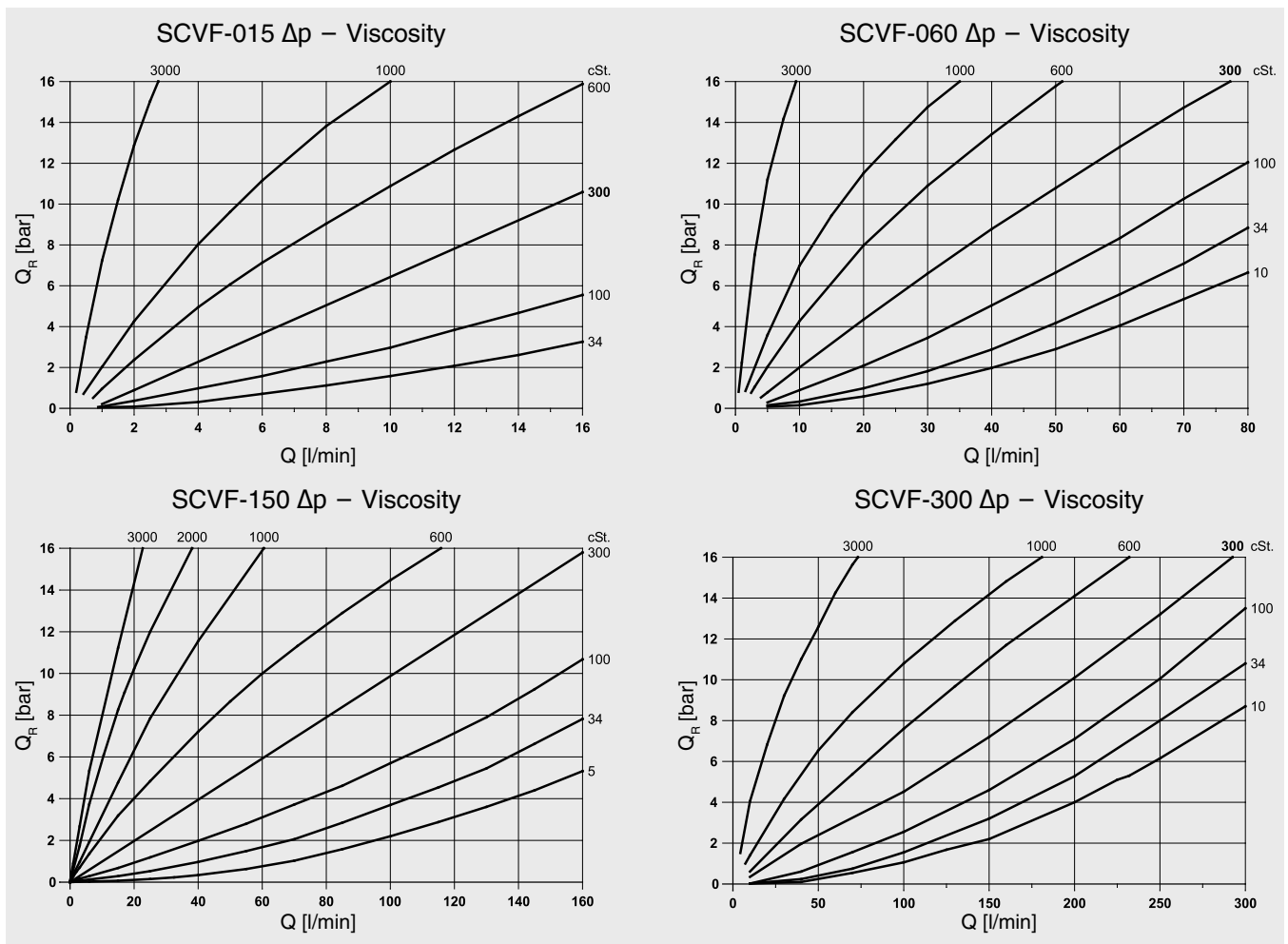
Connection Cables	#
Serviceman (4 pin) 2 m	SCK-102-02-08
Serviceman/Service Master (5 pin) 3 m	SCK-102-03-02
Extension 5 m	SCK-102-05-12

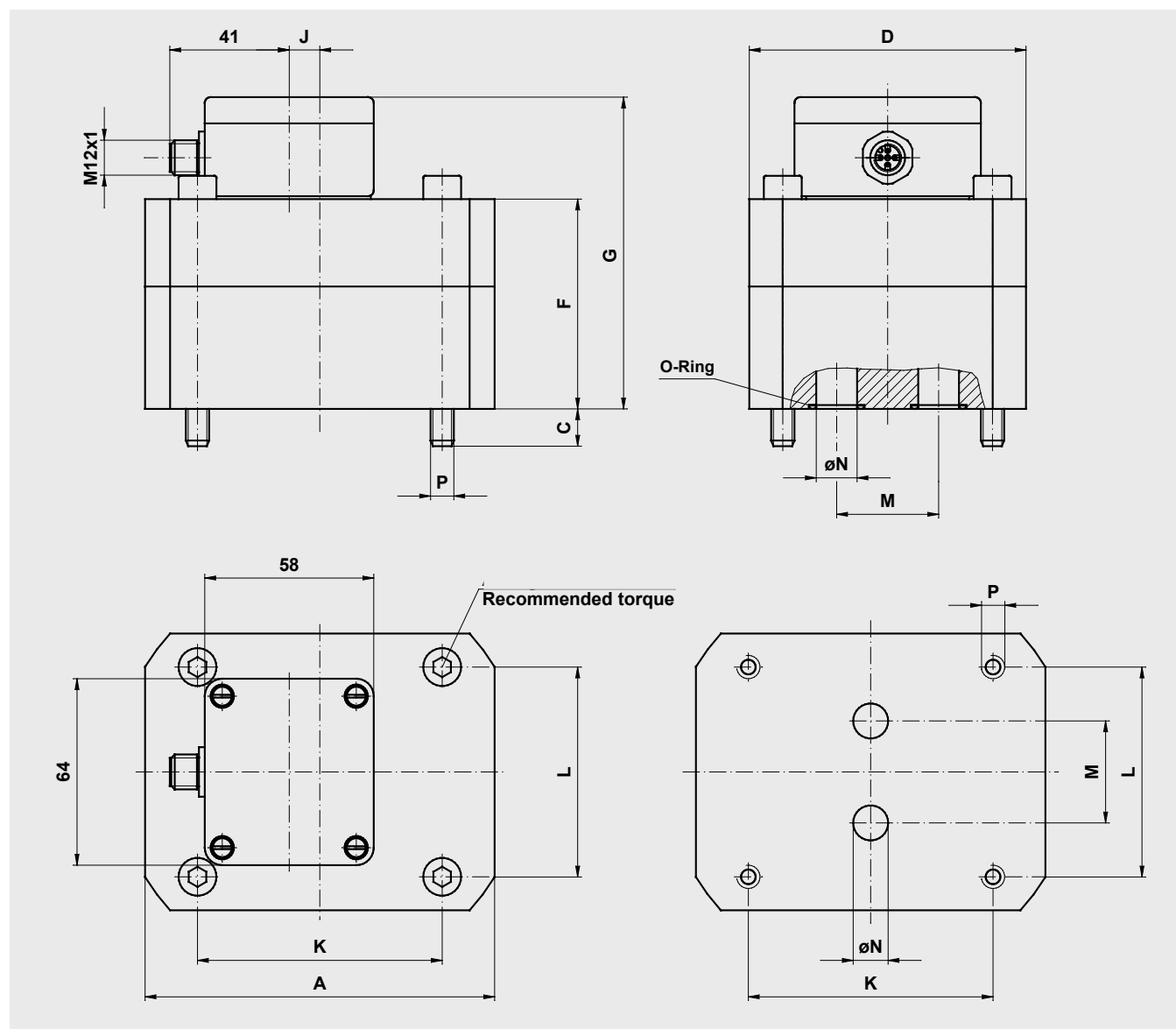
Typ	SCVF-015	SCVF-060	SCVF-150	SCVF-300
Flow Range QN (l/min)	1...015	0,4...060	0,6...150	1...300
Accuracy (\pm %) FS @ 21cSt.	0,5	0,5	0,5	0,5
Operating Pressure PN (bar)	400	400	315	315
Ports (A - B)	3/8" BSPP	1/2" BSPP	1" BSPP	1" BSPP
Pressure Drop ΔP_{\max} (bar) @ (FS)	Graph			
Weight (kg)	3,8	8,1	23	27

FS = FullScale) IR = Indicated Reading

Response Time (ms)	400
Q_{\max} (l/min)	QN x 1,1
Overload Pressure P_{\max} (bar)	PN x 1,2
Housing	GGG 40
Sealing	Viton® (FKM)
Parts in contact with media	Viton® (FKM), Steel, GGG 40

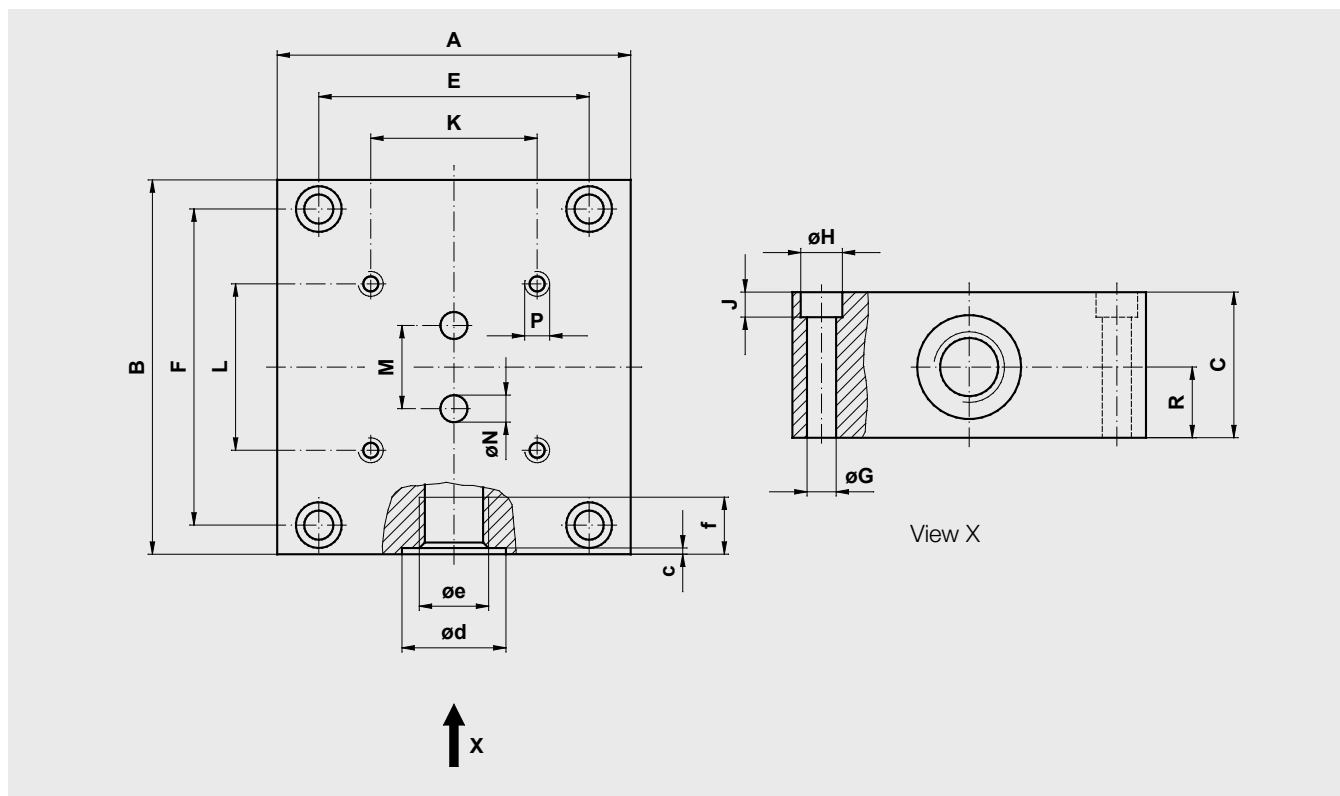
Ambient Temperature (°C)	+10...+50
Storage Temperature (°C)	-20...+80
T_{\max} Fluid (°C)	+110
Filtration (μm)	25
Viscosity Range (cSt.)	Graph





Type	Weight (kg)	Torque (Nm)	A	C	D	F	G	J	K	L	M	øN	P
SCVF-015	2	14	85	13	60	57	94	–	70	40	20	9	M6
SCVF-060	5,2	35	120	13	95	72	109	10,5	84	72	35	16	M8
SCVF-150	9	120	170	18	120	89	140	46,5	46	95	50	25	M12
SCVF-300	13	120	170	22	120	105	142	40	46	95	50	25	M12

all measurements in mm



Type	(kg)	A	B	C	E	F	ϕG	ϕH	J	K	L	M	ϕN	P	R	c	ϕd	ϕe BSPP	f
SCVF-015	1,8	85	90	35	65	76	7	11	7	70	40	20	6,5	M6/t=14	17	0,7	25	3/8"	13
SCVF-060	2,9	100	120	37	80	106	7	11	7	84	72	35	12	M8/t=18	17,5	0,7	29	1/2"	15
SCVF-150 SCVF-300	14	160	165	80	140	145	9	15	9	46	95	50	25	M12/t=24	28	1	42	1"	19

all measurements in mm

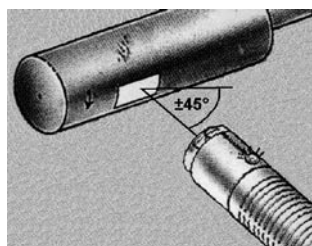
- **Contact less measurement of rotational speed**
- **Measurement of rotational speed up to 10,000 rpm**
- **Tachometer with fixed cable (2 m) for Serviceman or Service Master**



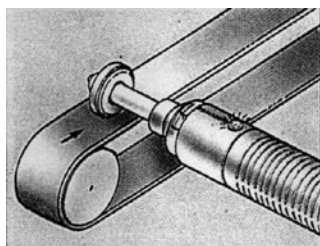
Rotational speed-dependent data, such as delivery from a variable pump, are determined ideally in combination with the pressure and flow-test of a hydraulic drive.

Contact-less measurement (opto-electronic principal) can be done quickly and easily.

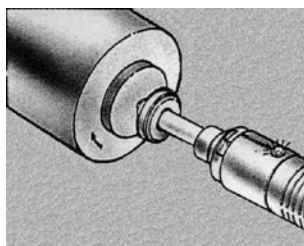
Rotational speed is detected, for example, at a main drive shaft (e. g. power take-off shaft of a tractor), and displayed on the hand-held device. Installation or adjustment is not necessary.



Rotating shaft - non-contact measurement of rotational speed.



Contact measurement of rotational speed with the contact adaptor



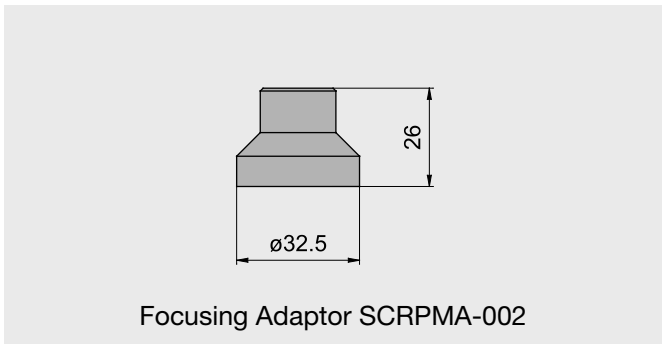
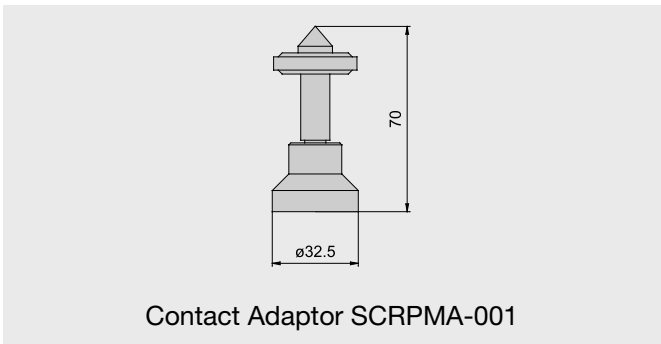
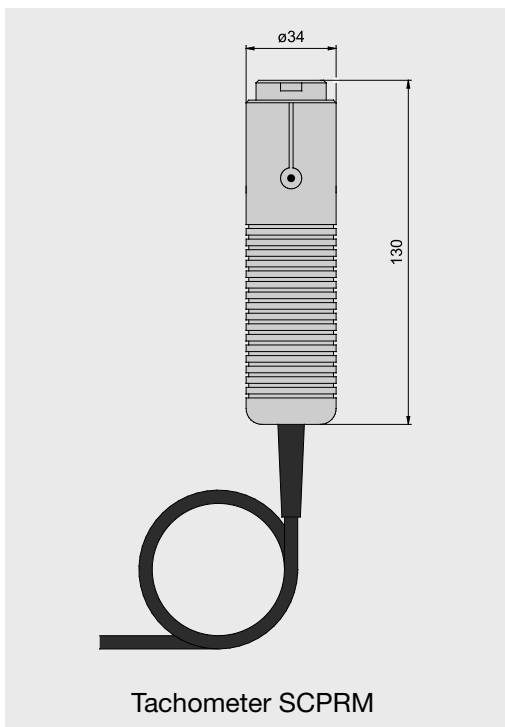
Front face measurement of rotational speed with contact adaptor.

For accurate acquisition of the opto-electronic signal, please use the supplied reflecting strips.

For a shaft or belt, the rotational speed is measured directly with the contact adaptor.

Technical Data	
Input	
Measuring distance	25...500 mm
Measuring angle	± 45°
Type of measuring	optical, red LED
Output	
Measuring range	20...10.000 RPM
Accuracy	< 0,5% FS
Resolution	± 5 RPM
Electrical connection	
Fixed cable 3 m	5-pin push-pull/4-pin
Ambient temperature	0...70 °C
General	
Material	ABS
Dimensions	Ø 34 mm/L = 130 mm
Weight	230 g

FS = Full Scale



Order references

Tachometer for connection to	#
Service man (4 pin)	SCRPM-210
Connection Cable 3 m	SCK-108-03-18
Service man/Service Master (5 pin)	SCRPM-220
Connection Cable 5 m	SCK-102-05-12

Contact Adaptor	001
Focusing Adaptor	002
Reflecting strip 0,5 m	010

SCRPMA-XXX

- Easy operation
- Automatic sensor recognition
- PC connection
- Not dependent on main power supply



Serviceman-Kits



Service Master-Kit

Serviceman/Service Master-Kits meet the requirements of modern industrial hydraulic systems as well as those of complex mobile hydraulics.

All hydraulic parameters, such as differential pressure, flow and hydraulic power can be measured, displayed and processed.

This allows fitters in mobile hydraulics as well as in construction and agricultural machinery to make exact diagnoses. Furthermore, comparisons between set and actual values can be made and documented.

Serviceman/Service Master-Kits are an ideal tool for all fitters in maintenance departments who need simple hydraulic test equipment for mobile as well as industrial hydraulics. Fast diagnosis in the fields of hydraulic machinery can be done very easily.

With the **SensoWin®** software, the data can be processed on a PC.

**The models described on page 52
are available ex stock**

Serviceman-Kits

#	SCKIT-152-600	SCKIT-152-1-00	SCKIT-152-2-00
SCC	SCC-150	SCC-560	SCC-560
Serviceman	SCM-152-1-02	SCM-152-1-02	SCM-152-2-02
SCSW-KIT-152	--	--	1
SCPT-600-02-02	1	Please order accessories (SCPT/SCT/SCFT/SCRPM) separate!	
SCK-102-03-02	1	1	2
SCA-EMA-3/3	1	1	2
SMA3-1500	1	1	2

Service Master-Kits

#	SCKIT-250-00	SCKIT-360-00	SCKIT-400-00	SCKIT-450-00
SCC-750	1	1	1	1
Service Master	SCM-250-1-01	SCM-360-1-01	SCM-400-1-01	SCM-450-1-01
SCSW-KIT-400	1	1	1	1
SCK-102-03-02	2	2	2	2
SCA-EMA-3/3	2	2	2	2
SMA3-1500	2	2	2	2
Please order accessories (SCPT/SCT/SCFT/SCRPM) separate!				

Serviceman/Service Master-p-Q-Kits

#	SCKIT-152-PQ	SCKIT-360-PTQ
SCC-560	1	1
Serviceman	SCM-152-2-02	--
Service Master	--	SCM-360-1-01
SCSW-KIT-152	1	--
SCSW-KIT-400	--	1
SCPT-600-02-02	1	2
SCT-150-04-02	--	1
SCFT-150-DRV	1	1
SCK-102-03-02	2	4
SCA-EMA-3/3	1	2
SMA3-1500	1	2

Diagnostic Products with Calibration Certificate acc. to ISO 9001

New instruments can be supplied on request with a calibration certificate to ISO 9001.

Typ	#
ServiceJunior	K-SCJN-xxx-01
ServiceJunior <i>wireless</i>	K-SCJNP-xxx-01-RC
Serviceman	K-SCM-152-x-02
Service Master	K-SCM-xxx-1-01
Pressure Sensors	K-SCPT-xxx-02-02
Temperature Sensor	K-SCT-150-04-02
Flow Sensors	K-SCFT-xxx-02-02
	K-SCQ-xxx-0-02
	K-SCVF-xxx-00-02

Kit	#
ServiceJunior	K-SCJN-KIT-xxx
ServiceJunior <i>wireless</i>	K-SCJNP-KIT-xxx-RC
Serviceman	K-SCKIT-152-x-00
	K-SCKIT-152-600
	K-SCKIT-152-PQ
Service Master	K-SCKIT-xxx-00
	K-SCKIT-360-PTQ

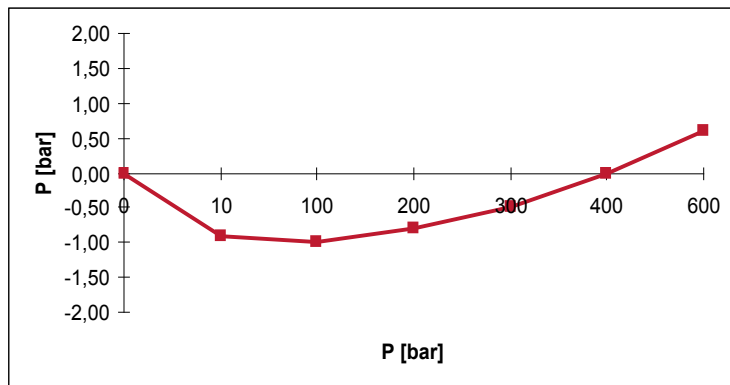
Certificate No. 3143

Description: Pressure Sensor
Model: SCPT-600-02-02
S/N: B1253S

Operating Range: 0...600 bar
Accuracy: $\pm 0,5\%$ FS

Reference1: Budenberg S/N 15404
Reference2: HP 3497A Data Logger

Cal. No. NO94 DKD-KO5801
Cal. No. 8370831402



Nominal (bar)	Actual (bar)	Deviation (bar)
0	0	0,00
10	9,1	-0,90
100	99	-1,00
200	199,2	-0,80
300	299,5	-0,50
400	400	0,00
600	600,6	0,60
0	0,1	0,10

10 Index

SCA-1/2-EMA-3	27/28	SCJN-KIT-xxx	52	SCQ-xxx-0-02	34-37
SCA-1/2-EMA-3-EL	27/28	SCJN-xxx-01	6-9		
SCA-1/2-EMA-3-S	27/28			SCRPM-220	49-50
SCA-1/2-PQC	27/28	SCJNP-KIT-xxx-RC	7		
SCA-1/4-EMA-3	27/28	SCJNP-xxx-01-RC	6-9	SCRPM-001	49-50
SCA-1/4-EMA-3-S	27/28			SCRPM-002	49-50
		SCK-102-03-02	13/21/22		
SCA-EMA-3/1	27/28	SCK-102-05-12	26	SCSN-450	11/18
SCA-EMA-3/2	27/28				
SCA-EMA-3/3	27/28	SCK-318-05-21	11/18	SCSW-KIT-152	11/15
SCA-EMA-3/4	27/28			SCSW-KIT-400	24
SCA-EMA-3/PD	27/28	SCKIT-152	51-52		
		SCKIT-360-PTQ	51-52	SCT-150-0-02	29-32
SCA-GMA3/20S/T	29/32	SCKIT-xxx-00	51-52	SCT-150-04-02	29-32
SCAQ-060	35	SCLV-PTQ	42-43	SCT-400-K-01	29-32
SCAQ-150	35			SCTA-400-02	29-32
SCAQ-GIR1/2A4CX	35	SCM-152-x-02	10-15		
		SCMA	23	SCVF-xxx-00-02	44-48
SCFT-150-DRV	43	SCM-xxx-1-01	16-24		
SCFT-xxx-02-02	38-41				
		SCPT-xxx-02-02	25-26		



Parker Hannifin Corporation

About Parker Hannifin Corporation

Parker Hannifin is a leading global motion-control company dedicated to delivering premier customer service.

A Fortune 500 corporation listed on the New York Stock Exchange (PH), our components and systems comprise over 1,400 product lines that control motion in some 1,000 industrial and aerospace markets.

Parker is the only manufacturer to offer its customers a choice of hydraulic, pneumatic, and electromechanical motion-control solutions. Our Company has the largest distribution network in its field, with over 7,500 distributors serving nearly 400,000 customers worldwide.

Parker's Charter

To be a leading worldwide manufacturer of components and systems for the builders and users of durable goods.

More specifically, we will design, market and manufacture products controlling motion, flow and pressure. We will achieve profitable growth through premier customer service.

Product Information

Customers seeking product information, the location of a nearby distributor, or repair services will receive prompt attention by calling the Parker Product Information Centre.

The Centre can be called toll free from France, Germany, Austria, Switzerland or the United Kingdom. You will be answered by a Parker employee in your own language. Call Freephone: 00800-2727-5374 (00800 C PARKER H).

The Aerospace Group

is a leader in the development, design, manufacture and servicing of control systems and components for aerospace and related high-technology markets, while achieving growth through premier customer service.



The Climate & Industrial Controls Group

designs, manufactures and markets system-control and fluid-handling components and systems to refrigeration, air-conditioning and industrial customers worldwide.



The FluidConnectors Group

designs, manufactures and markets rigid and flexible connectors, and associated products used in pneumatic and fluid systems.



The Seal Group designs, manufactures and distributes industrial and commercial sealing devices and related products by providing superior quality and total customer satisfaction.



The Hydraulics Group

designs, produces and markets a full spectrum of hydraulic components and systems to builders and users of industrial and mobile machinery and equipment.



The Filtration Group

designs, manufactures and markets quality filtration and clarification products, providing customers with the best value, quality, technical support, and global availability.



The Automation Group

is a leading supplier of pneumatic and electromechanical components and systems to automation customers worldwide.



The Instrumentation Group

is a global leader in the design, manufacture and distribution of high-quality critical flow components for worldwide process instrumentation, ultra-high-purity, medical and analytical applications.



Parker Europe Sales Offices

Parker Hannifin Ges.mbH
A-2700 Wiener Neustadt
Tel: +43 2622 23501
Fax: +43 2622 66212

Parker Hannifin Corporation
AE-Abu Dhabi
Tel: +971 2 6788587
Fax: +971 2 6793812

Parker Hannifin Corporation
AZPAR
AZ-370 000 Baku
Tel: +994 12983966
Fax: +994 12983966

Parker Hannifin S.A.-N.V.
B-1400 Nivelles
Tel: +32 67280900
Fax: +32 67280999

Parker Hannifin s.r.o.
CZ-184 00 Prague 8
Tel: +420 2 83085224
Fax: +420 2 83085360

Parker Hannifin GmbH & Co. KG
D-41564 Kaarst
Tel: +49 2131 513-0
Fax: +49 2131 513-230

Parker Hannifin Danmark A/S
DK-2750 Ballerup
Tel: +45 43560400
Fax: +45 43733107

Parker Hannifin España S.A
E-28850 Torrejón de Ardoz (Madrid)
Tel: +34 91 6757300
Fax: +34 91 6757711

Parker Hannifin Corporation
EG-Cairo
Tel: +20 2 5194018
Fax: +20 2 5190605

Parker Hannifin France SAS
F-74130 Contamine-sur-Arve
Tel: +33 450258025
Fax: +33 450978660

Parker Hannifin Oy
FIN-01510 Vantaa
Tel: +358 9 476731
Fax: +358 9 47673200

Parker Hannifin plc
GB-Warwick CV34 6TU
Tel: +44 1926 833700
Fax: +44 1926 889172

Parker Hannifin Corporation
GR-171 21 Athens
Tel: +30 21 0933-6450
Fax: +30 21 0933-6451

Parker Hannifin Corporation
HU-1149 Budapest
Tel: +36 1 220-4155
Fax: +36 1 422-1525

Parker Hannifin S.p.A.
I-20094 Corsico (MI)
Tel: +39 02 451921
Fax: +39 02 4479340

Parker Sales Ireland Ltd
IE-Blackrock, Co. Dublin
Tel: +353 1 293 9999
Fax: +353 1 293 9900

Parker Hannifin Corporation
Gateway Ventures Ca Ltd.
KZ-480100 Almaty
Tel: +7 327 2 543 081
Fax: +7 327 2 541 100

Parker Hannifin A/S
N-1402 Ski
Tel: +47 64 91 10 00
Fax: +47 64 91 10 90

Parker Hannifin B.V.
NL-7570 AT Oldenzaal
Tel: +31 541 585000
Fax: +31 541 585459

Parker Hannifin Sp.z.o.o.
PL-02-235 Warszawa
Tel: +48 22 8634942
Fax: +48 22 8634944

Parker Hannifin Portugal Lda
PT-4450-625 Leça da Palmeira
Tel: +351 22 9997360
Fax: +351 22 9961527

Parker Hannifin Corporation
Hidro Consulting Impex Srl
RO-00001 Bucharest
Tel: +40 21 252-1382
Fax: +40 21 252-3381

Parker Hannifin Corporation
RU-123001 Moscow
Tel: +7 095 2340054
Fax: +7 095 2340528

Parker Hannifin Corporation
RU-693000 Yuzhno-Sakhalinsk
Tel: +7 4242 727242
Fax: +7 4242 727242

Parker Hannifin AB
S-16308 Spånga
Tel: +46 8 59795000
Fax: +46 8 59795110

Parker Hannifin Corporation
SI-8000 Novo Mesto
Tel: +386 7 337-6650
Fax: +386 7 337-6651

Parker Hannifin Corporation
TR-34067 Merter/Istanbul
Tel: +90 212 48291-06/07
Fax: +90 212 48291-10

Parker Hannifin Corporation
UA-01004 Kiev
Tel: +380 44 2207432
Fax: +380 44 2206534

Parker Hannifin Africa
ZA-Kempton Park
Tel: +27 11 961-0700
Fax: +27 11 392-7213

Internet: http://www.parker.com/euro_tfd

**For further information on other Parker Products, call the European Product Information Centre
free of charge on 00800 2727 5374.**



CAT/4054-1/UK
© 2005 Parker Hannifin/1105
Bentrup 1105