90 Series Multi-Parameter Portables

www.tps.com.au

Waterproof | User Friendly | Calendar Clock | GLP | Notepad Function | Automatic Logging | RS232 Port | Multiple Power

Waterproof Construction

At TPS we know that working in wet areas is sometimes unavoidable. The **90** series is designed for rugged field applications in wet environments. The enclosure, keypad and connectors are rated to IP65. Chemically resistant, plastic connectors with gold plated contacts are used where possible. A sturdy plastic case is available for field use.

TPS uses the latest microprocessor electronics in the **90** Series, resulting in excellent long term reliability.

User-friendly

All measurements are shown simultaneously on the 80 character display. There is no need to change modes to check any of your vital data. The user-friendly menu system guides the operator through all operations such as calibration, setup etc. Full text help and error messages are provided along the way. There are no obscure codes to interpret like some other brands.

A full function keypad with raised, tactile buttons is provided. The Menu and Function keys are used to navigate the menu system. Several One-Touch keys are provided for instant access to often-used functions. The numeric keys are used to enter user settings such as buffers, standards etc and include decimal point and delete keys.

Notepad Function

A standard feature of the **90** series is the Notepad function. Up to 9900 readings (depending on model) can be recorded for later review. These can be downloaded to a printer or computer via the RS232 port. For added functionality, the user is able to enter up to two additional items to be tagged on to the reading. Many operators use this function as a site identifier, depth or readings from other instruments.

Automatic Datalogging

Automatic datalogging provides the capability to automatically record up to 9900 readings (depending on model) at user-set intervals. This is equivalent to a reading every half hour, continuously for over 50 days. The unit remains dormant between readings and only wakes up for 40 seconds whenever a reading is due. Battery life is considerably improved with this facility.

Automatic Calibration

All **90** Series measurement parameters feature Automatic Calibration. Calibration is accessed via the user-friendly menu, which then leads the user through each step using plain text messages.

Sensor condition is displayed after calibration has been completed, allowing for preventative maintenance. This information can be recalled on the display at any time.

All calibration information is stored in memory when the **90** Series is switched off, even if the battery is replaced.

Good Laboratory Practices

To comply with GLP guidelines, the date, time and results of the last calibration are stored in memory, along with the unit's serial number. This data can be displayed or sent directly to the RS232 port. Warning of failed calibration is provided. All readings stored in memory include the date and time.

RS232 Serial Port

The **90** Series comes standard with a RS232 serial port (cable sold separately). All readings stored in memory can be downloaded to a PC. The RS232 port also allows the **90** Series to log directly to a PC. **Win*TPS*** communications software for Windows 95 and later is available.

Multiple Power Options

The **90** Series is supplied with a 7.2V NiCad rechargeable battery pack and charger to suit country of destination as standard. For extended field trips or long term datalogging, a solar panel, car cigarette lighter adapter or clip lead adaptor for an external 12V battery are also available. The **90** Series battery can be recharged from any 12V DC power source.

Australian Made

The **90** Series is proudly designed and manufactured in Australia. Our aim is to provide you with the best quality, service and value for money. The TPS Quality System has been certified in accordance with ISO 9001:2008. Since 1968, TPS has built a reputation for excellent backup service that is second to none. The **90** Series sets the standard for Quality, Service and Value for field logging instruments.

90 Series Specifications

Good Laboratory Practices

Date, Time and Value of last calibration for each parameter are stored. This information can be recalled or sent to the RS232 port at any time.

Warning of failed calibration is provided.

All readings stored in memory include the date and time.

Datalogging

Memory Capacity

90-FLT. . . . . : 6500 readings (5400 with extra data input active).
90-FLMV . . . : 7200 readings (5900 with extra data input active).
90-FL. . . . . : 8100 readings (6500 with extra data input active).
90-D . . . . . : 9300 readings (7200 with extra data input active).
90-C . . . . . : 9900 readings (8100 with extra data input active).
90-P . . . . . : 9300 readings (7200 with extra data input active).

Extra Data Input

2 extra items of data can be input when using the Notepad function.

Each item can be a maximum of 4 characters, including a decimal point.

Extra Data items are labeled A and B.

Automatic Datalogging

All 6 models can be programmed to...

- Automatically log from 1 to 288 readings per day.
- Automatically log readings at a preset interval for a preset duration.

RS232 Port

8 Bits, No Parity, 1 Stop Bit, XON/OFF Protocol.
300, 9600 & 19200 baud available.

Enclosure

Rugged polycarbonate plastic construction. Case, keypad and connectors waterproof to IP65.

Display

2 line x 40 Character alphanumeric LCD shows all readings simultaneously and features a user-friendly menu system.

Keypad

5 Function keys, Menu key, Enter key, 3 One-Touch keys, 12 data entry keys, OFF, ON.

Dimensions

230 x 140 x 100 mm

Mass

Instrument only . . . . : Approx 1.5 kg
Full kit . . . . . : Approx 4.5 to 10 kg, depending on model and accessories purchased.

Environment

Temperature . . . . . : 0 to 45 °C
Humidity. . . . . : 0 to 95 R.H.

Power

7.2V Rechargeable NiCad Battery.

Any 12V DC supply will re-charge the battery.

Model	pH	Millivolts	Conductivity	TDS	Salinity	Dissolved Oxygen	Turbidity	Temperature
90-FLT	●	●	●	●	●	●	●	●
90-FLMV	●	●	●	●	●	●		●
90-FL	●		●	●	●	●		●
90-D						●		●
90-C			●	●	●			●
90-P	●	●						●

90 Series Specifications

Mode	Range(s)	Resolution	Accuracy	General Specifications
pH	0 to 14.00 pH	0.01 pH	±0.01 pH	▸ Auto-recognition of pH4.01, pH6.86, pH7.00, pH9.18 and pH10.01 Buffers. Any other buffer values can be entered during calibration. ▸ -1.00 to +1.00 pH Asymmetry range ▸ 85.0% to 105.0% Slope range ▸ >3 x 10^{12} Ohms input impedance ▸ Automatic or manual temperature compensation, 0 to 100 °C
ORP	0 to ±1999 mV	1 mV	±1 mV	▸ Factory-set calibration ▸ Temperature compensation not applicable
Conductivity	k=10 Sensor 0 to 200.0 uS/cm 0 to 2000 uS/cm 0 to 20.00 mS/cm 0 to 200.0 mS/cm k=1.0 Sensor 0 to 20.00 uS/cm 0 to 200.0 uS/cm 0 to 2000 uS/cm 0 to 20.00 mS/cm k=0.1 Sensor 0 to 2.000 uS/cm 0 to 20.00 uS/cm 0 to 200.0 uS/cm 0 to 2000 uS/cm	0.1 uS/cm 1 uS/cm 0.01 mS/cm 0.1 mS/cm 0.01 uS/cm 0.1 uS/cm 1 uS/cm 0.01 mS/cm 0.001 uS/cm 0.01 uS/cm 0.1 uS/cm 1 uS/cm	±0.5 % of full scale of selected range at 25.0 °C	▸ Any calibration standard value from 20 uS/cm to 200 mS/cm can be user set. ▸ Span calibration range 75% to 133% of nominal k factor ▸ Automatic temperature compensation, -5 to 70 °C
TDS	k=10 Sensor 0 to 100.0 ppM 0 to 1000 ppM 0 to 10.00 ppK 0 to 100.0 ppK k=1.0 Sensor 0 to 10.00 ppM 0 to 100.0 ppM 0 to 1000 ppM 0 to 10.00 ppK k=0.1 Sensor 0 to 1.000 ppM 0 to 10.00 ppM 0 to 100.0 ppM 0 to 1000 ppM	0.1 ppM 1 ppM 0.01 ppK 0.1 ppK 0.01 ppM 0.1 ppM 1 ppM 0.01 ppK 0.001 ppM 0.01 ppM 0.1 ppM 1 ppM	±0.5 % of full scale of selected range at 25.0 °C	▸ Calibration with conductivity standards in conductivity mode only. ▸ TDS factor 0.40 to 1.00 (default value 0.65) ▸ Automatic temperature compensation, -5 to 70 °C
Salinity	k=10 Sensor 0 to 8.00 % 0 to 80.0 PSU k=1.0 Sensor 0 to 1.19 % 0 to 11.9 PSU k=0.1 Sensor 0 to 0.10 % 0 to 1.0 PSU	0.01 % 0.1 PSU 0.01 % 0.1 PSU 0.01 % 0.1 PSU	±0.5 % of full scale of selected range at 25.0 °C	▸ Calibration with conductivity standards in conductivity mode only. ▸ Automatic temperature compensation, -5 to 70 °C
Dissolved Oxygen	0 to 30.00 ppM (mg/L) 0 to 300.0 % Saturation 0 to 60.0 % Gaseous	0.01 ppM (mg/L) 0.1 % Saturation 0.1 % Gaseous	±0.02 ppM (mg/L) ±0.2 % Saturation ±0.1 % Gaseous	▸ Two point calibration: Zero and Span (in Air). ▸ 0% to 7% Zero calibration range. ▸ 65% to 200% Span calibration range. ▸ Automatic Salinity Correction using Conductivity / TDS / Salinity reading. ▸ Automatic temperature compensation -5 to 50 °C for... 1. Membrane permeability 2. Oxygen solubility in ppM mode
Turbidity	0.0 to 200.0 NTU 200 to 2000 NTU	0.1 NTU 1 NTU	±1% of full scale ±1% of full scale	▸ Zero Calibration range 0 to 15.0 NTU ▸ Span Calibration range 90.0 to 110.0 % ▸ Turbidity Standards Low Range . . . . .30.0 to 180.0 NTU High Range . . . . 300 to 2000 NTU ▸ 90°measurement technique as per ISO7027.
Temperature	-10.0 to 110.0 °C	0.1 °C	±0.2 °C	▸ Calibration against reference thermometer. ▸ Sensor Offset range -10.0 to +10.0 °C ▸ The following temperature limits apply to sensors... Temperature probe : 120 °C pH or ORP sensor : 60 °C Conductivity sensor : 60 °C Dissolved Oxygen sensor : 45 °C Turbidity sensor : 60 °C

Ordering Information

90-D Dissolved Oxygen, Temperature

90-D 1m 123145/1

1 metre bundle 123145/1:

YSI 5739 Dissolved Oxygen Sensor (no cable) 123204
1m cable for dissolved oxygen sensor 123220
Membrane & filling solution kit 123300
Battery Charger 130009
Manual

90-D 5m 123145/5

5 metre bundle 123145/5:

YSI 5739 Dissolved Oxygen Sensor (no cable) 123204
5m cable for dissolved oxygen sensor 123219
Membrane & filling solution kit 123300
Battery Charger 130009
Manual

90-C Conductivity, TDS, Salinity, Temperature

90-C 1m 122145/1

1 metre bundle 122145/1:

k=1 Conductivity/Temperature Sensor, 1m 122193
2.76mS/cm Conductivity Standard, 200mL 122306
Battery Charger 130009
Manual

90-C 5m 122145/5

5 metre bundle 122145/5:

k=1 Conductivity/Temperature Sensor, 5m 122196
2.76mS/cm Conductivity Standard, 200mL 122306
Battery Charger 130009
Manual

90-P Dual Channel pH/ORP plus Temperature

90-P 1m 121145/1

1 metre bundle 121145/1:

Submersible pH, sensor, 1m cable 121227
Temperature sensor, 1m cable 124211
pH7.00 Buffer, 200mL 121387
pH4.01 Buffer, 200mL 121381
Battery Charger 130009
Manual

90-P 5m 121145/5

5 metre bundle 121145/5:

Submersible pH, sensor, 5m cable 111224
Temperature sensor, 5m cable 124210
pH7.00 Buffer, 200mL 121387
pH4.01 Buffer, 200mL 121381
Battery Charger 130009
Manual

Options and accessories for 90 Series models

pH Sensor Upgrade: difficult samples such as slurries...
pH, Intermediate Junc, 1m 121200/1
pH, Intermediate Junc, 5m 121200/5

ORP Sensor Upgrade: difficult samples such as slurries...
ORP, Intermediate Junc, 1m 121260/1
ORP, Intermediate Junc, 5m 121260/5

Dissolved Oxygen Field Stirrer:
YSI 5739 Dissolved Oxygen Sensor Stirrer 123306

BOD Dissolved Oxygen Sensors:
YSI non-stirring BOD Sensor (1.5m cable) 123214
YSI self-stirring BOD Sensor (1.5m cable) 123213

Dissolved Oxygen Sensor Maintenance:
YSI5739 Field Sensor & Non Stirring BOD Sensor
Membrane & filling solution kit 123300
Filling Solution only, 45mL 123303
Zero calibration Sodium Sulphite 123302
Rejuvenation kit 123307
Diaphragm replacement kit 123304
(Above for YSI5739 Field Sensor Only)

YSI Self-Stirring BOD Sensor
Membrane Cap Kit 123308

Temperature Sensors:
Temperature Sensor, 1m cable 124211
Temperature Sensor, 5m cable 124210

Turbidity Sensor Protector:
Sensor Protector Cover 125189

Sensor Holders:
Sensor holder for 90FL & 90FLMV 121343
Sensor holder for 90FLT 121345

Cable Extension:
Extra cable, per metre 130040

Computer Interface:
RS232 serial port cable to connect to computer 130015
Serial to USB adaptor cable (used with 130015) 130087
WinTPS Software for Windows 130086

Power options:
12V Solar charging panel 130012
12V Car cigarette lighter lead 130013
Clip lead for external 12V battery 130024

Carry case:
Waterproof carry case 130058

Same Price Interchange Option:
Choose between k=0.1, k=1 and k=10 Conductivity Sensor

1 metre Plastic (for 1 metre bundles)
K=10 Conductivity/Temperature Sensor, 1m 122194
K=0.1 Conductivity/Temperature Sensor, 1m 122195

5 metre Plastic (for 5 metre bundles)
k=10 Conductivity/Temperature Sensor, 5m 122218
K=0.1 Conductivity/Temperature Sensor, 5m 122197

Ordering Information

90-FL pH, Conductivity, TDS, Salinity, Dissolved Oxygen, Temperature

90-FL 1m 126103/1

1 metre bundle 126103/1:

Submersible pH, sensor, 1m cable. 121227
k=1 Conductivity/Temperature Sensor, 1m 122193
YSI 5739 Dissolved Oxygen Sensor (no cable) 123204
1m cable for dissolved oxygen sensor 123220
Membrane & filling solution kit 123300
pH7.00 Buffer, 200mL 121387
pH4.01 Buffer, 200mL 121381
2.76mS/cm Conductivity Standard, 200mL 122306
Battery Charger 130009
Manual

90-FL 5m 126103/5

5 metre bundle 126103/5:

Submersible pH, sensor, 5m cable 111224
k=1 Conductivity/Temperature Sensor, 5m 122196
YSI 5739 Dissolved Oxygen Sensor (no cable) 123204
5m cable for dissolved oxygen sensor 123219
Membrane & filling solution kit 123300
pH7.00 Buffer, 200mL 121387
pH4.01 Buffer, 200mL 121381
2.76mS/cm Conductivity Standard, 200mL 122306
Battery Charger 130009
Manual

90-FLMV pH, ORP, Conductivity, TDS, Salinity, Dissolved Oxygen, Temperature

90-FLMV 1m. 130018/1

1 metre bundle 130018/1:

Submersible pH, sensor, 1m cable. 121227
ORP, Submersible, 1m 121268
k=1 Conductivity/Temperature Sensor, 1m 122193
YSI 5739 Dissolved Oxygen Sensor (no cable) 123204
1m cable for dissolved oxygen sensor 123220
Membrane & filling solution kit 123300
pH7.00 Buffer, 200mL 121387
pH4.01 Buffer, 200mL 121381
2.76mS/cm Conductivity Standard, 200mL 122306
ORP Calibration Solution, 200mL 121309
Battery Charger 130009
Manual

90-FLMV 5m. 130018/5

5 metre bundle 130018/5:

Submersible pH, sensor, 5m cable 111224
ORP, Submersible, 5m 111259
k=1 Conductivity/Temperature Sensor, 5m 122196
YSI 5739 Dissolved Oxygen Sensor (no cable) 123204
5m cable for dissolved oxygen sensor 123219
Membrane & filling solution kit 123300
pH7.00 Buffer, 200mL 121387
pH4.01 Buffer, 200mL 121381
2.76mS/cm Conductivity Standard, 200mL 122306
ORP Calibration Solution, 200mL 121309
Battery Charger 130009
Manual

90-FLT pH, ORP, Conductivity, TDS, Salinity, Dissolved Oxygen, Turbidity, Temperature

90-FLT 1m 126105/1

1 metre bundle 126105/1:

Submersible pH, sensor, 1m cable. 121227
ORP, Submersible, 1m 121268
k=1 Conductivity/Temperature Sensor, 1m 122193
YSI 5739 Dissolved Oxygen Sensor (no cable) 123204
1m cable for dissolved oxygen sensor 123220
Membrane & filling solution kit 123300
Turbidity Sensor, no cable 125186
1m cable for turbidity sensor 125185
pH7.00 Buffer, 200mL 121387
pH4.01 Buffer, 200mL 121381
2.76mS/cm Conductivity Standard, 200mL 122306
ORP Calibration Solution, 200mL 121309
90 NTU Diluted Standard, 200 mL 125216
900 NTU Diluted Standard, 200mL 125220
Black calibration Bottle x 2 125300
Battery Charger 130009
Manual

90-FLT 5m 126105/5

5 metre bundle 126105/5:

Submersible pH, sensor, 5m cable 111224
ORP, Submersible, 5m 111259
k=1 Conductivity/Temperature Sensor, 5m 122196
YSI 5739 Dissolved Oxygen Sensor (no cable) 123204
5m cable for dissolved oxygen sensor 123219
Membrane & filling solution kit 123300
Turbidity Sensor, no cable 125186
5m cable for turbidity sensor 125187
pH7.00 Buffer, 200mL 121387
pH4.01 Buffer, 200mL 121381
2.76mS/cm Conductivity Standard, 200mL 122306
ORP Calibration Solution, 200mL 121309
90 NTU Diluted Standard, 200 mL 125216
900 NTU Diluted Standard, 200mL 125220
Black calibration Bottle x 2 125300
Battery Charger 130009
Manual

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