



Instruction Manual

SPSR-115/230
Self-Powered Sensor
TTL Pulse Output



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SAFEGUARDS AND PRECAUTIONS



Read and follow all instructions in this manual carefully, and retain this manual for future reference.

Do not use this instrument in any manner inconsistent with these operating instructions or under any conditions that exceed the environmental specifications stated.

This instrument is not user serviceable. For technical assistance, contact the sales organization from which you purchased the product.



In order to comply with EU Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE): This product may contain material which could be hazardous to human health and the environment. **DO NOT DISPOSE** of this product as unsorted municipal waste. This product needs to be **RE-CYCLED** in accordance with local regulations; contact your local authorities for more information. This product may be returnable to your distributor for recycling; contact the distributor for details.

Monarch Instrument's Limited Warranty applies.
See www.monarchinstrument.com for details.

Warranty Registration and Extended Warranty Coverage information is available online at www.monarchinstrument.com.

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1.0 INTRODUCTION

The SPSR-IM Self Powered Sensor Interface Module is a self-contained, rechargeable battery powered device for developing a TTL compatible one pulse per revolution output for triggering external equipment such as vibration analyzers, spectrum analyzers, stroboscopes, data acquisition equipment, tachometers, balancers, waveform analyzers and magnetic tape recorders.



*SPSR-115/230
SPSR-IM, ROS-P and
Universal Recharger*

The SPSR-115/230 is comprised of the SPSR-IM Interface Module, which provides power to a sensor and couples the sensor to a BNC output; an input sensor with a visible red LED light source (ROS-P); and a battery recharger.

Optional sensors such as an optical laser sensor (ROLS-P-not shown), infrared sensor (IRS-P), or an amplified magnetic sensor (MT-190P) may also be combined with the SPSR-IM Interface Module when appropriate. (See separate instructions for these configurations.)



*IRS-P
Infrared Sensor*



*MT-190P
Magnetic Trigger Sensor*

2.0 FUNCTIONS AND OPERATION

2.1 SPSR Interface Module

The SPSR Interface Module (SPSR-IM) provides power to the input sensor, receives and optionally inverts the return pulse signal, and provides a switch selectable positive going 0 to 5 V dc or negative going 5 to 0 V dc pulse train trigger output on a BNC connector. Connections and operation are common to all SPSR models. Fully charged internal NiMH batteries will typically provide greater than 40 hours of continuous operation. In addition, the SPSR system can be operated continuously on external power by use of the recharger/power supply provided.

2.1.1 Connections

Connect the input sensor via the 1/8" [3.5 mm] phone plug to the mating connector on the SPSR-IM. This sensor may remain connected even when recharging the internal batteries of the SPSR-IM.

NOTE: Do not plug an input sensor into the SPSR with the Power switch in the ON position. Before plugging the sensor in, switch the power to OFF and unplug any external power supply.

Connect the output signal cable to the BNC connector on the opposite end of the SPSR-IM and to the external equipment to be triggered.

If operating from the recharger/power supply, connect the recharger to the connector marked **EXTERNAL DC** on the SPSR-IM and connect the wall unit to the appropriate power source.

2.1.2 Controls

The **POWER** switch on the SPSR-IM controls both the operation and the charging of the system. The unit will only charge from external power in the power OFF position. In the power ON position, the unit will operate directly from external power any time that it is being supplied. Otherwise, it functions on internal battery power.

The **OUTPUT SELECTION** switch determines the polarity of the leading edge of the TTL compatible output signal. In the **NON-INVERTING** position, the output signal on the BNC connector will be a negative going 5 to 0 V dc pulse derived directly from the conditioned sensor output. When the **INVERTING** position is switch selected, the BNC output signal will be a positive going 0 to 5 V dc, TTL compatible.

LED Indication:

Unit operational = solid green

Unit charging = blinking red

Charging done = solid red

NOTE: Short red blinks followed by long blink = charge error; contact factory.

2.1.3 Recharging the Batteries

To recharge the SPSR-IM Interface Module batteries:

1. Connect the recharger/power supply to the **EXTERNAL DC** input connector.
2. Connect the recharger/power supply into a working ac outlet.
3. Be sure the **POWER** switch is in the **OFF (CHARGE)** position. The red **CHARGE** LED will indicate that the batteries are being charged. Allow up to 4 hours to fully charge.

3.0 SPSR-115/230 SERIES - SPSR-IM WITH ROS-P

The SPSR-115/230 consists of the SPSR-IM Interface Module described above, an ROS-P Remote Optical Sensor with eight foot cable and mounting bracket, and an SPSR-U (115/230 V ac) external power connection. One foot of T-5 Reflective Tape is also supplied.

3.1 ROS-P

When connected to the SPSR-IM as described above, the ROS-P illuminates the target with a visible red light from a high intensity LED and detects the reflected pulses from the rotating reflective tape target with an internal photo-detector. The ROS-P Remote Optical Sensor is capable of detecting a reflected pulse from T-5 Reflective Tape targets at distances of up to 3 feet and angles up to 45 degrees from the target. The sensor is supplied with a set of two M16 jam nuts and a 90° angle slotted aluminum mounting bracket.

For most applications, a 1/2" square piece of T-5 Reflective Tape should be applied to a clean area on the rotating object. The sensor should be mounted and optically aligned to illuminate the reflective target once per revolution. **It is recommended that the optical sensor be placed at a slight angle (approximately 10-15 degrees) from perpendicular, so that the sensor will detect only the reflected pulses from the target.** The sensor should be at least 2 inches and no more than 3 feet from the target. The green LED On-Target Indicator on the ROS-P will blink at the input frequency or be continuously illuminated when properly aimed.

3.2 Operating the SPSR as a Triggering Source

Once the ROS-P input sensor is properly mounted and aligned, further connections and operation should proceed in accordance with the functions and descriptions under the SPSR Interface Module sections entitled *Connections* and *Controls*.

The pulse signal on the connector marked **OUTPUT** provides a sharp leading edge for reliable and repeatable triggering of the connected device. This output is capable of driving a hundred feet of coax cable. Be sure to select the direction (0 to 5 V dc or 5 to 0 V dc) of this signal to provide the required polarity of the leading edge to properly trigger the connected equipment.

4.0 BATTERY DISPOSAL

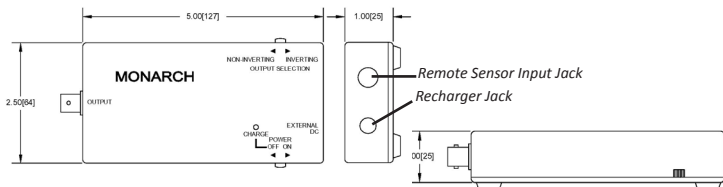
Prior to disposing of the SPSR-IM, the user must remove the Nickel Metal Hydride batteries. To do this, remove the four (4) rubber feet on the bottom of the unit. This will expose four (4) screws that must be removed to dismantle the bottom case piece, exposing the batteries. Remove the batteries and place tape over the battery terminals to prevent them from shorting. The batteries should be sent to a recycling center or returned to the factory. The rest of the parts may now be disposed of.

NOTE: This product contains nickel metal hydride (NiMH) batteries. Replace only with the same type of battery – Rechargeable NiMH.

5.0 SPECIFICATIONS

Specifications*	SPSR-IM Interface Module
Internal Batteries	Nickel metal hydride (NiMH) battery pack, 4.8 V dc
Operating Interval	>40 hours typical with ROS-P (~40 mA load)
Charge Time	Up to 4 hours
Output	TTL compatible pulse, INVERTED or NON-INVERTED switch selectable With ROS (negative pulse) input, output will be a positive pulse when set to inverted or negative pulse when set to non-inverted; optionally, the output can be open collector (external pull-up required)
Bandwidth	0 to 100 kHz
Battery Current Draw	12 mA with k Ω load (operational)
7.5 V Input Current Draw	14 mA with k Ω load (operational)
Power Supply	SPSR-U (operational/charge)
LED Indicator	Status indication; see LED Indication section
Output Connector	BNC connector (female)
Operating Temperature	32 °F to 122 °F (0 °C to 50 °C)
Weight	8.3 oz. (235 g)
Dimensions	5.0 in. x 2.5 in. x 1 in. [127 mm x 64 mm x 25 mm]

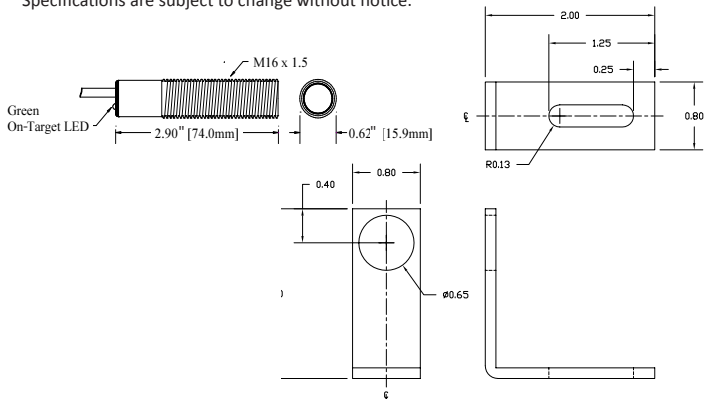
*Specifications are subject to change without notice.



SPSR-IM Dimensions

Specifications*	ROS-P Remote Optical Sensor
Operating Envelope	Up to 3 ft. [0.9 m] and 45° from reflective target
Speed Range	1 to 250,000 RPM
Illumination Source	Visible red LED, 5 V dc @ 30 mA
Operating Temperature	14 °F to 158 °F (-10 °C to 70 °C)
Output Signal	5 to 0 V dc TTL compatible pulse
On-Target Indicator	Green LED on end cap
Material	303 Stainless steel
Lens	Acrylic plastic
Cable Length	8 ft. [2.5 m] Standard
Dimensions	Threaded Tube: 2.90 in. L x 0.625 in. diameter [M16 x 1.5 x 74 mm] supplied with two M16 jam nuts and mounting bracket

*Specifications are subject to change without notice.



ROS-P and mounting bracket Dimensions

5.1 Compliance

Both the SPSR-IM and ROS-P units are CE compliant.

- Low Voltage Directive (LVD) 2014/35/EU
- Electromagnetic Compatibility Directive (EMC) 2014/30/EU
- Restriction of Hazardous Substances (RoHS) Directive 2011/65/EU

6.0 SENSORS/OPTIONS AND ACCESSORIES

ROS-P Remote Optical Sensor with 8 ft. [2.5 m] cable and mounting bracket



PN: 6180-057

ROS-P-25 Remote Optical Sensor with 25 ft. [7.6 m] cable and mounting bracket

PN: 6180-057-25

ROLS-P Remote Optical Laser Sensor with 8 ft. [2.5 m] cable and mounting bracket



PN: 6180-029

IRS-P Infrared Sensor with 8 foot [2.5 m] cable for use without reflective target at 0.5 inch [12.7 mm] gap (5 to 500,000 RPM)



PN: 6180-020

MT-190P Magnetic Trigger Sensor/Amplifier with 8 ft. [2.5 m] cable - 0.250" [6.4 mm] operating gap from target, 2" (L) x 5/8" [50.8 x 15.9 mm]



PN: 6180-036

EC-25P 25 foot [7.6 m] Extension Cable for remote sensors with male 1/8" [3.5 mm] phone plug to female 1/8" [3.5 mm] connector



PN: 6180-028

T-5 Reflective Tape 5 ft. [1.5 m] roll, 1/2 inch [13 mm] wide



PN: 6180-070

T-5WP Reflective Tape, waterproof, honeycomb pattern, 5 ft. [1.5 m] roll, 1-inch [25 mm] wide



PN: 6180-079

BP-R Replacement NiMH Battery Pack *(for SPSR-IM ONLY)*



PN: 6180-066

SPSR-U Universal Recharger with plugs, 115/230 V ac - 50/60 Hz



PN: 6180-059

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Fixed Mounted Strobes



Portable Strobes



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Speed Sensors



DataChart™ Paperless Recorders



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