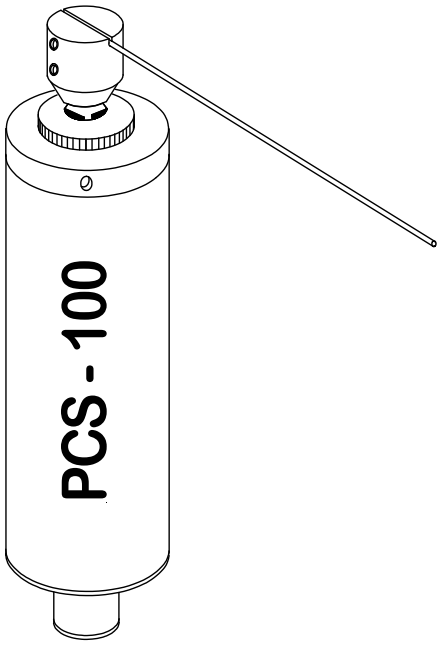
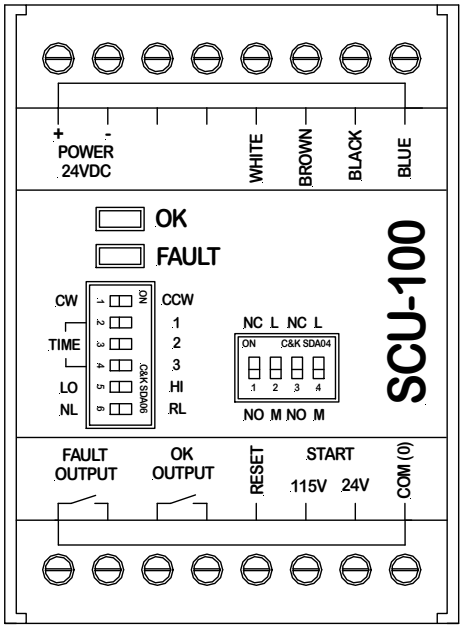
PCS – 100 SYSTEM

INSTALLATION INSTRUCTIONS





Made in the USA

PCS - 100 SPECIFICATIONS

SCU100

Input: 24VDC, 250mA

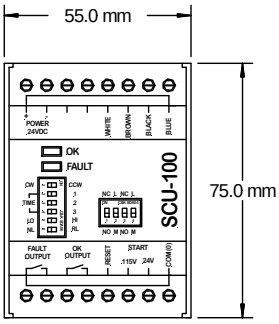
Relay Outputs: 2A, 250VAC
general use

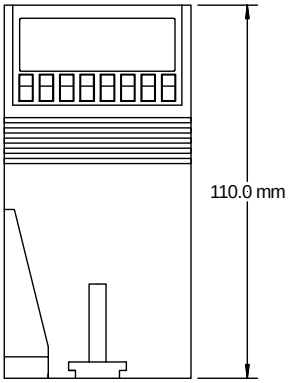
Ambient Temp: 55°C

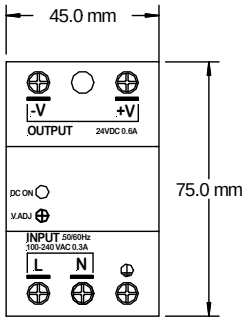
Wiring Terminals: 18-14AWG
stranded copper wire only, 7 lb/in Torque. One wire per terminal.

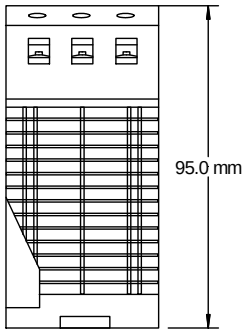
Housing Matl.: Polycarb UL94V1
Terminal Matl.: Polycarb UL94V2

Mounting: 35mm DIN Rail









24VDC Power Supply

Input Power: 110-240VAC

Output Voltage: 24VDC

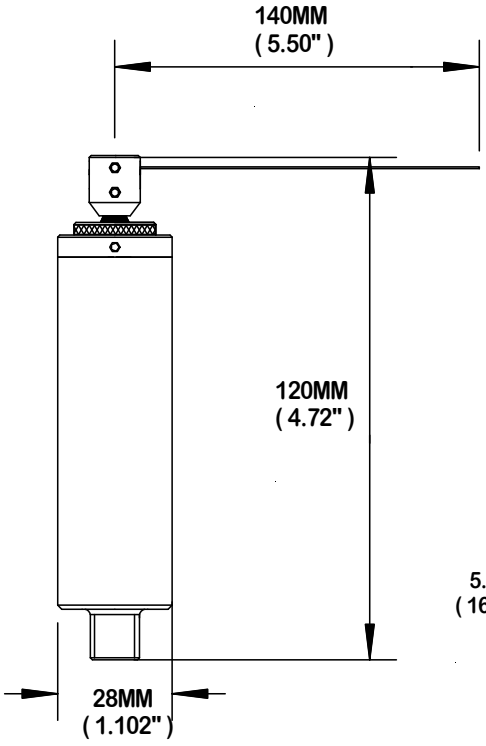
Output Power: 15W

Operating Temp: 0-55 C

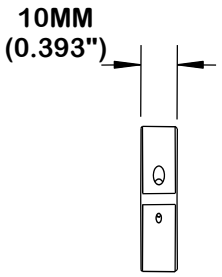
Mounting: 35mm DIN Rail

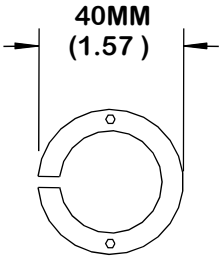
Optional power supply required for 110 - 240 VAC operation

IND. CONT. EQ.
35BY

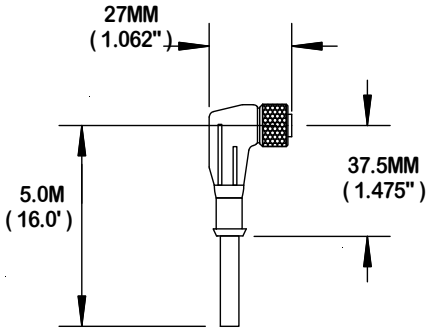


PCS-100

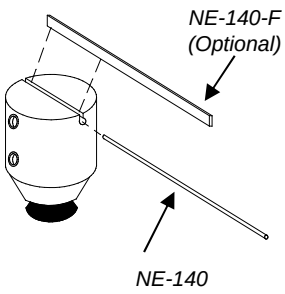




CS-6000



SC-0500



SA-5000

1. General Use / Description

The Positive Contact System consists of two main components; a Positive Contact Sensor (PCS) and a Sensor Control Unit (SCU).The control unit is mounted in the machine electrical cabinet, while the sensor is mounted in close proximity to the tool which is to be monitored.

The sensor monitors the tool presence by light physical contact of the tool tip with the sensing needle assembly. If the tool is present at the specific station , the needle will contact the tool tip and return to its starting position. The machine cycle will then be allowed to continue.

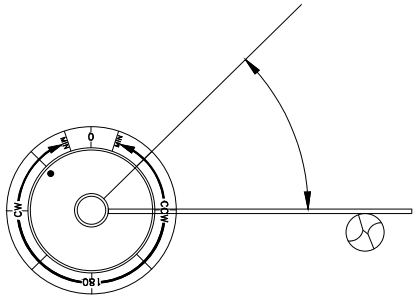
If the tool is broken, the needle will swing past the broken tool to its complete swing angle stop. This condition will immediately be interpreted as a fault condition, and the control unit sends the appropriate stop output to the machine control.

2. Determine The Mounting Position

Determine where you wish to mount the PCS sensor. This will depend on the space available and the tooling configuration of your machine. The variables are listed below.

a) Preference for clockwise (CW) or counter clockwise (CCW) swing direction.

b) Swing angle (see fig. 1) The most common swing angle selection is 45º to 90º. ~180º of swing is available in either swing direction.



(Figure 1) 45º CW swing angle.

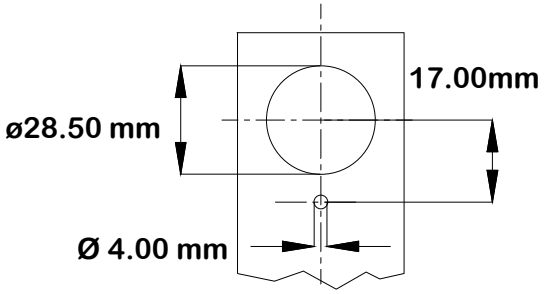


Figure 2

c) You will need to fabricate a mounting bracket that will hold the sensor in place. If you will mount the sensor using the clamping collar provided, drill holes in the bracket per figure 2.

d) The standard sensing needle length is shown in figure 3. You may use either a longer (up to 8") or shorten the standard sensing needle to your application.

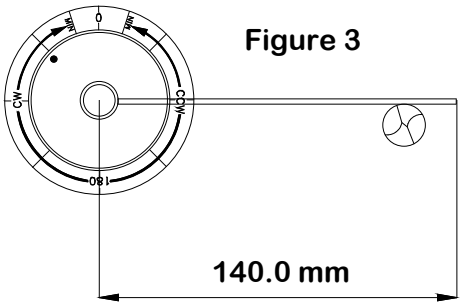
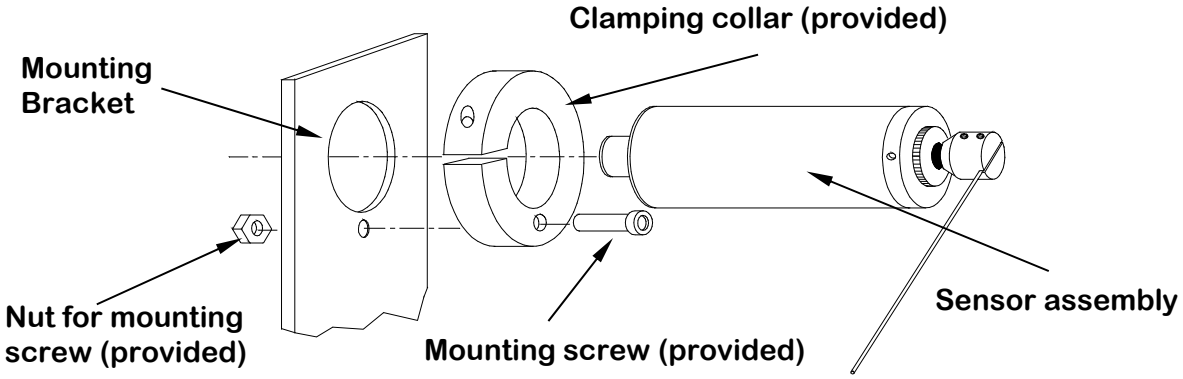


Figure 3

Note: If a straight sensing needle does not suit your needs, the sensing needle may be bent into any desired configuration.

3. Mount the Clamping Collar to the bracket

The clamping collar holds the PCS sensor body and allows for attachment to the mounting bracket fabricated by the customer according to the application. Below is a typical mounting example.



4. Install the mounting bracket according to your application

5. Loosen and remove the sensing needle assembly

Loosen the 1.5mm set screw "B" on the sensing needle assembly and slide the assembly off the sensor. (Figure 5)

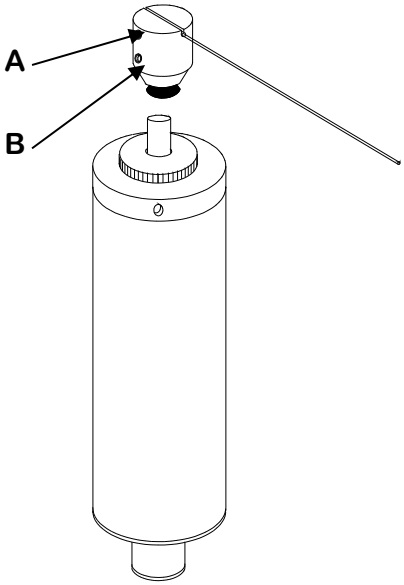
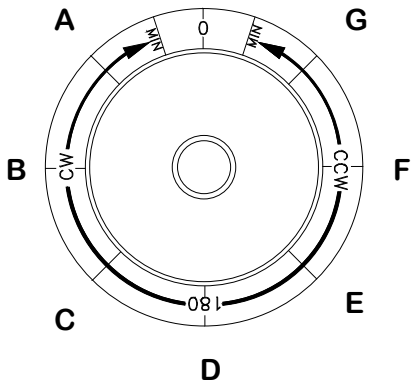


Fig. 5

6. Set swing direction and angle

The PCS sensor features a 180° adjustable swing angle in either a CW or CCW direction. The sensor can be preset at the factory to your specifications. If you did not specify a swing angle in your order, the sensor is set to a 90° CW swing. CW or CCW is established by looking at the sensing needle straight on (looking at the adjusting ring). The ring is divided into 45° increments. (See fig. 6)

Fig. 6



A = CW 45°

B = CW 90°

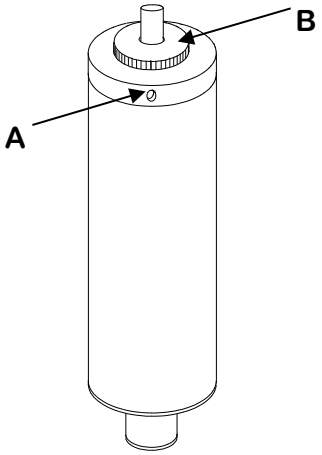
C = CW 135°

D = CW/CCW180°

E = CCW 135°

F = CCW 90°

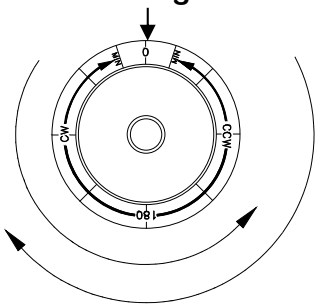
G = CCW 45°



To change the swing angle or swing direction loosen the set screw "A" until the knurled adjusting ring "B" can be manually rotated. Note that the knurled ring has a red mark.

Turn the knurled ring to the desired swing angle in either CW or CCW field. If you are changing from CW to CCW or from CCW to CW, always move away from the zero zone and **PAST** the 180° mark, (~5°). Once you have passed the 180° mark, the sensor will operate in the CW or CCW field it is in. **The knurled ring will not move through the zero zone.** Once the desired swing angle and direction are set, tighten set screw "A".

The red mark on the adjusting ring will not rotate through this zone.



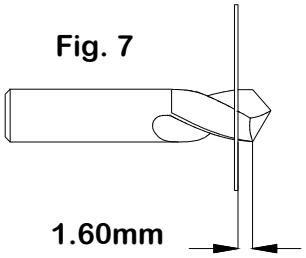
When moving from CW to CCW, rotate the adjusting ring in this direction.

When moving from CCW to CW, rotate the adjusting ring in this direction.

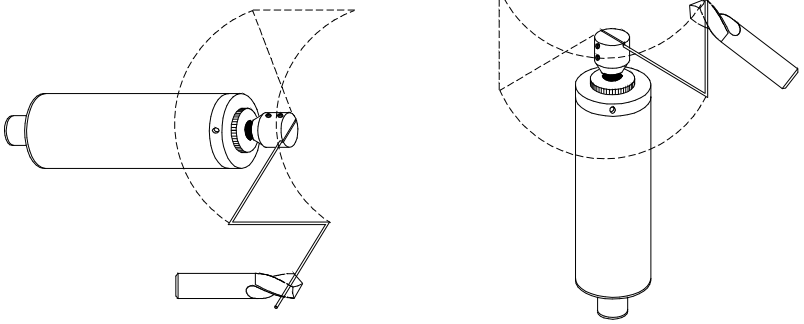
7. Mount the sensor in the bracket.

Slip the PCS sensor into and through the bracket assembly. Connect the power cable to the sensor and then rotate the sensor in the bracket so the connector points in the desired direction. Be sure the cable is properly positioned to avoid any interference with the machine operation. Note: If the cable needs to be re-positioned while attached to the sensor, rotate the entire sensor to avoid damage to the connector.

Fig. 7



Reinstall the sensing needle assembly but do not fasten it. Move the sensor body forward or back so the needle will contact the tool according to the sketch in figure 7. Once the sensing needle assembly is properly located, tighten the clamping collar fastener to secure the sensor to the bracket. Remove the sensing needle assembly.



Alternative Mounting Examples

8. Install the Sensor Control Unit. (SCU)

Install the SCU-100 in the electrical cabinet according to the installation instructions. If you have specified a supply voltage of 115V an additional power supply has been included. The power supply is not required for 24VDC operation.

9. Set CW or CCW selector switch on the SCU.

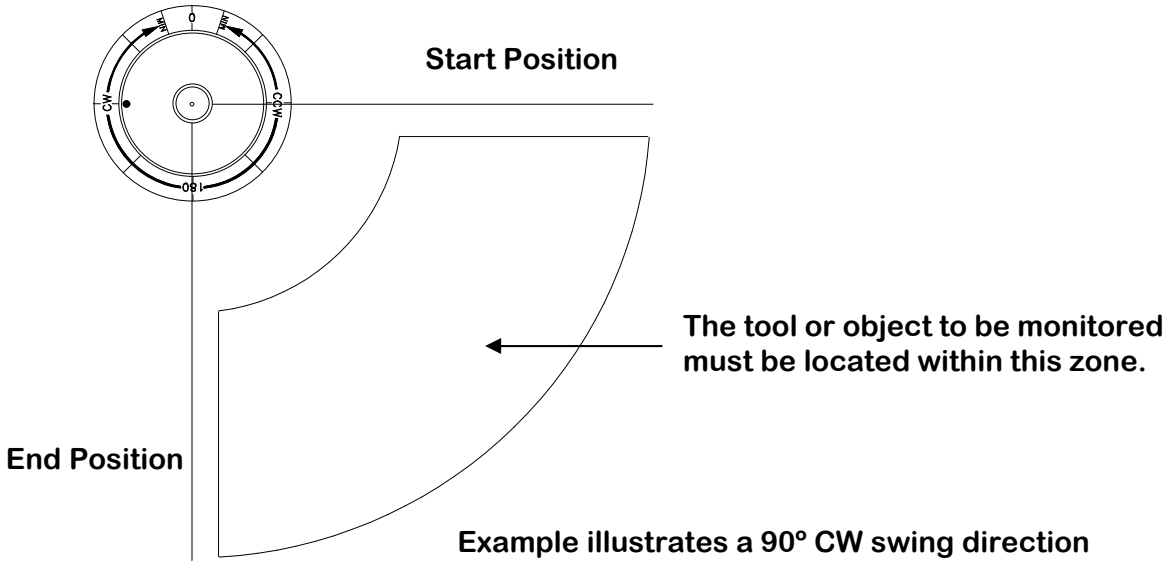
If you have selected a CW or CCW swing direction on the sensing head, flip the selector switch on the SCU to the corresponding setting.

10. Supply power to the SCU.

Once power has been supplied to the SCU, the sensor will rotate to its starting position.

11. Re-install the sensing needle assembly.

Re-install and fasten the sensing needle assembly so that the sensing needle will contact the tool anywhere between the starting position of the needle and the end position of the needle.



12. Check your installation.

Cycle the PCS sensor. If the sensing needle assembly is installed properly, the needle will contact the tool tip and return to its starting position. The green "OK" LED on the SCU will illuminate . Now, remove the tool and initiate another start input. The needle should travel through its full swing angle to the end stop. This simulates a broken tool condition. The red "FAULT" LED on the SCU should be illuminated.

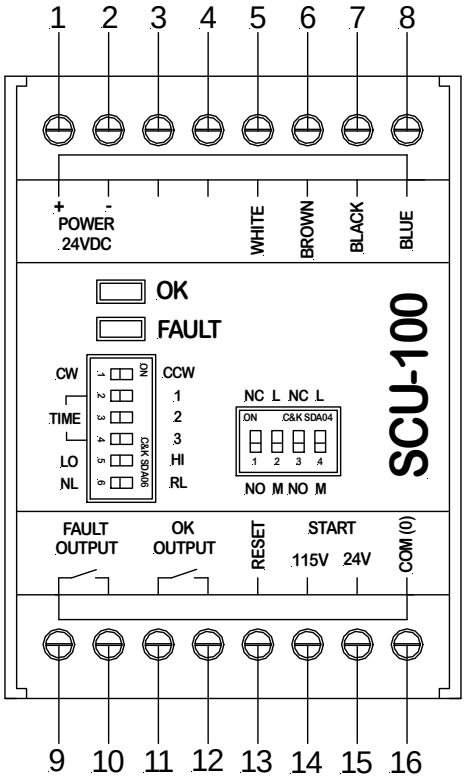
SCU Terminal Descriptions

Terminals 1 & 2: The SCU operates with 24VDC, note that terminal 1 is + and terminal 2 is - . This unit requires a minimum supply of 250 mA. When powering the SCU with an existing 24VDC power supply, confirm that the supply is capable of additional output capacity to power the SCU.

Terminals 3 & 4: Not used.

Terminals 5, 6, 7 & 8: Sensor cable connection, as indicated. The preferred method is to connect the cable directly from the sensor to the SCU. If the SCU and sensor need to be connected via external junction box, avoid wiring near electromagnetic or high current devices.

DO NOT connect the braided shield in the supplied sensor cable to the machine ground !



Terminals 9 & 10: are dry contacts (internal relay) capable of switching 2A @ 250 VAC. The contact operation can be configured eliminating peripheral devices for interfacing the SCU. (see Relay Control Switches, page 7)

Terminals 11 & 12: are dry contacts (internal relay) capable of switching 2A @ 250 VAC. The contact operation can be configured eliminating peripheral devices for interfacing the SCU. (see Relay Control Switches, page 7)

Terminal 13: Is used to reset the SCU after a fault condition has been detected. The required input is + 24VDC for a minimum of 100mS. (OPTIONAL)

Terminals 14, 15 & 16 are used to activate the checking sequence when required in your application. T-16 is the common for either a 115VAC start signal (T-14) or a 24VDC start signal (T-15). The SCU recognizes a change of state in the circuit to activate the checking sequence. A minimum duration of 100mS is required regardless of the of the signal utilized, (HI – LO – HI) or (LO – HI – LO).

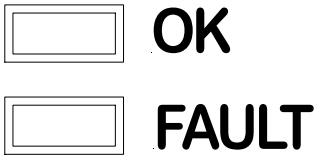
The Start Signal can also be used as a RESET function. After the error condition has been corrected, (replace broken tool), applying a Start Signal will cause the sensor to begin the checking sequence; touching and confirming that the tool has been replaced, in-turn resetting the Control Unit.

Certain solid state devices, although in their off (LO) state, may output a small amount of current. Depending on the operating characteristics of these devices, the SCU may not recognize a change of state. If this condition occurs in your application you may need to incorporate an external relay to activate the checking sequence.

Sensor Control Unit Switches

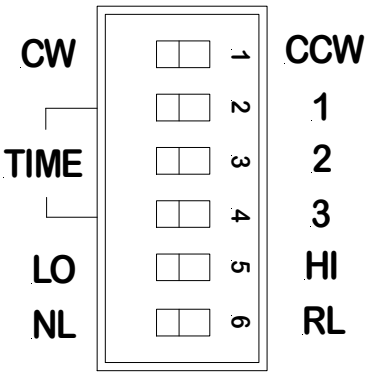
Please Note: Unless otherwise specified when ordered, the SCU-100 Control Unit has been preset at the factory with a CW direction, #2 Time Setting and a HI Rate.

OK LED (See Relay Control Switches Below)
The OK LED will illuminate at power on. When a start signal is initiated the LED will momentarily turn off. If a good condition has been detected the LED will again illuminate momentarily.



FAULT LED (See Relay Control Switches Below)
When a fault or broken tool condition is detected the FAULT LED will illuminate momentarily or until the unit is reset if relay is set to Latch.

CW / CCW Switch
This switch selects the rotation of the sensor. This setting **MUST** correspond with the knurled adjustment on the sensor.



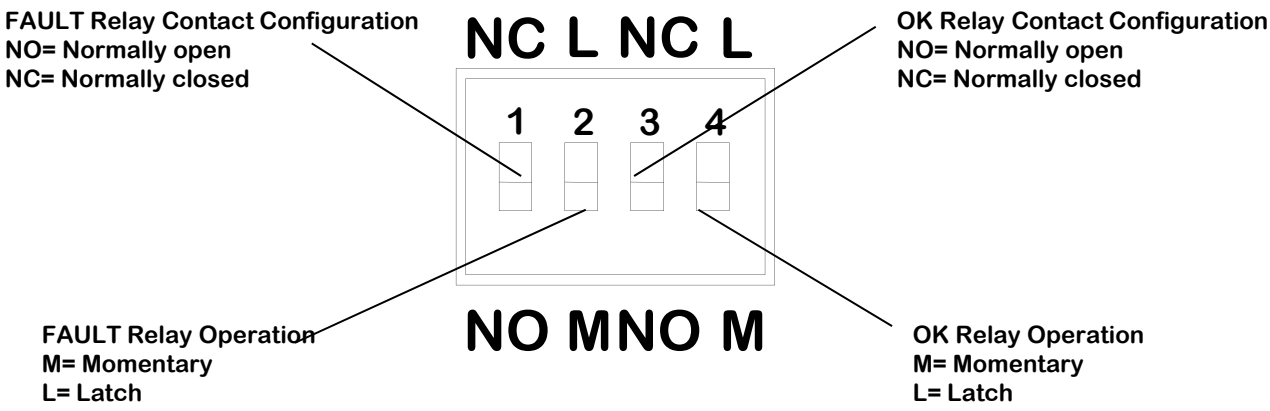
LO / HI Switch
Selects the rate at which the sensor swings. "HI is the correct setting for nearly all applications. "LO" rate is a slower swing rate generally used only for micro tool detection. NOTE: The V-seal in the swing arm assembly provides additional protection against contaminants and should not be removed in most applications. The V-seal may however restrict the sensors motion when the swing rate is set on "LO". If your application does not allow "HI" rate operation, you may remove the V-seal from the swing arm assembly to determine if this solves the problem.

Time Switches
These switches control the amount of time the sensor rotates during the scanning sequence. Since it takes a greater amount of time to swing the sensing needle 180° than 90°, a greater amount of time needs to be set. If the sensor will not reach its end or fault position with the tool removed simply set more time. **NOTE**: If a TIME selection has not been made the Control Unit operates at a default LO-LO setting used for very small micro-drill applications only. (See LO/HI Switch settings above with regards to V-seal in Swing Arm Assembly).

NL/RL Switch
Selects the units operational mode and logic.
NL= Normal logic RL= Reverse logic (free space monitoring)

Relay Control Switches

These switches are used to set the condition and the operation of the SCU's internal relays.
These features have been added for increased interface flexibility



SCU Installation Guide

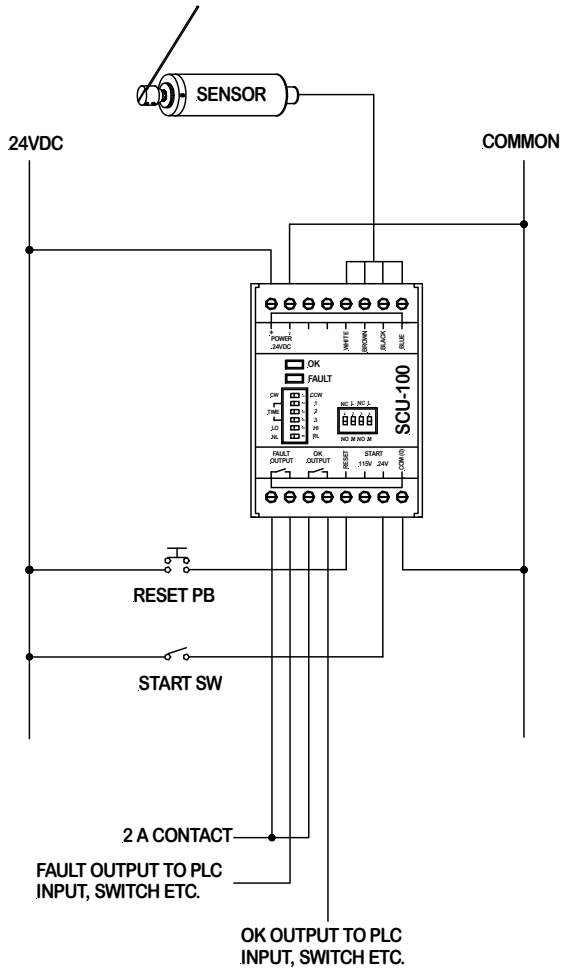
ESD/EMF PROTECTION: The SCU is a microprocessor based unit. When mounting the SCU in the machines electrical cabinet avoid placing it near sources which might produce ESD (electro static discharge), or EMF (electro magnetic frequencies), such as large motor starters or high current devices. ESD/EMF may interfere with the units operation.

The cable supplied with the sensor is fully shielded. The preferred installation method is to connect the sensor cable directly to the SCU. If your installation requires connecting the sensor to the SCU via a junction box/terminal strip, avoid wiring near EMF sources. The distance of the sensor connection to the SCU should not exceed 50m (165').

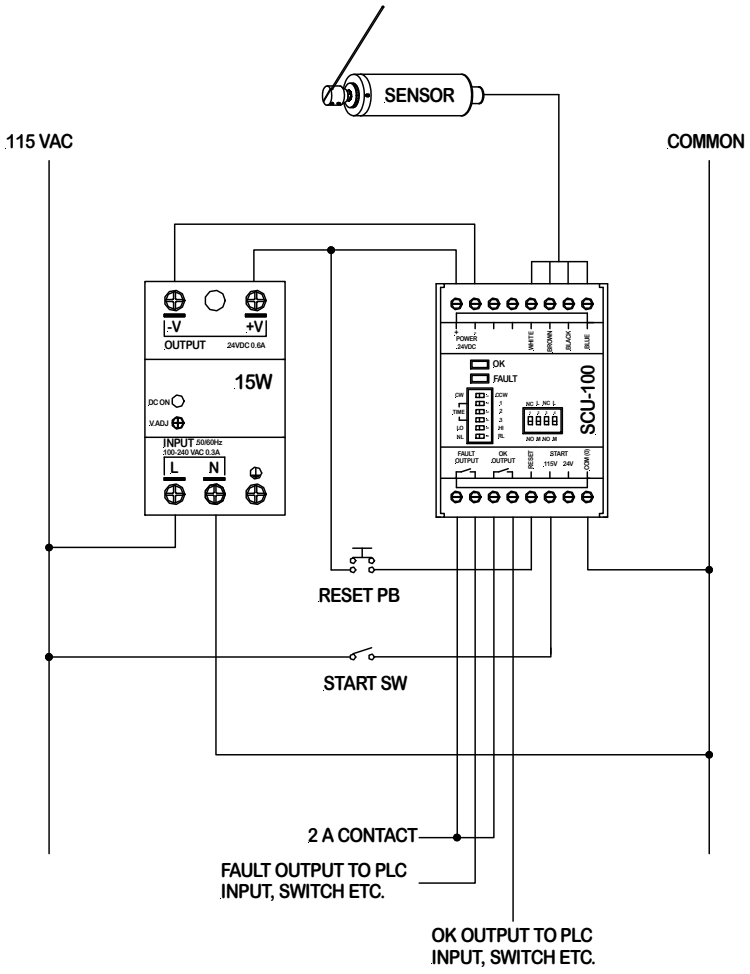
Special length shielded cables are available upon request.

Below is a basic wiring diagram for 24VDC and 115VAC machine control voltages. For any questions or installation assistance call 1-855-866-5911.

BASIC WIRING DIAGRAM SCU-100/24VDC



BASIC WIRING DIAGRAM SCU-100/100-240VAC



PCS-100 System
Trouble Shooting Guide

Please refer to the section that best describes the problem you are having. Determine if you can answer YES to all of the questions. If not, attempt to correct the condition. If at anytime you have questions, please contact our service department at 1-855-TOOL-911 (855-866-5911).

SYSTEM FAULT (Red and green lights are illuminated simultaneously.)
- Has a time been selected via the dip switches on the SCU-100?
- Is the PCS-100 set in the same direction as the CW/CCW switch on the SCU-100?
- Is the swing angle setting on the PCS-100 offset **at least 5º** from the 0º and 180º marks?
- Is the PCS-100 returning to its start position at the end of each cycle?
    - Color coded wires of cable should be attached to the correct terminals on the SCU-100
    - Cable should be screwed tight to the PCS-100
    - The inside of the PCS-100 connector should be dry
- Manually move the sensing needle away from the start position. Does the sensing needle return to the start position on its own?
- Is there approximately 4.1VDC across the blue and black terminals on the SCU-100? (The PCS-100 must remain connected to the SCU-100 for this measurement.)
- Is there 24VDC across the Power terminals on the SCU-100?
    - If not, see **No Power** to SCU-100

SCU-100 WILL NOT START (Lights remain steady, PCS-100 does not swing and SCU-100 gives no output when a start signal is applied.)
- Is the start signal being applied to the correct terminals?
    - Terminals 15 & 16 are for a 24VDC start signal.
    - Terminals 14 & 16 are for a 115VAC start signal.
- Is the correct start signal being applied?
    - The signal can be AC or DC voltage. Polarity does not matter.
    - The SCU-100 can be started with a *low, high, low* sequence or *a high, low, high* sequence. The SCU-100 will always start on the transition from *low* to *high*.
    - Is the *high* condition either 24V or 115V?
    - Is the *low* condition 0 V?
        - The *low* condition ***must be 0 V***. If the *low* condition is not an absolute 0 V, the SCU-100 may not recognize it.
    - Is each change in condition being held for at least 100ms?
    - In an environment with a lot of electrical noise, (ie: large motors or motor starters), the *high, low, high* sequence will block any noise from accidentally starting the SCU-100.
- Is the start signal being applied ***after*** the SCU-100 has completely finished its last cycle?

FAULT SIGNAL WHEN TOOL IS OK.
- Is the PCS-100 sensor set to swing in the correct direction to contact the tool?
- Is the tool within the PCS-100's swing angle?
    - The sensing needle of the PCS-100 should be set to swing at least 5º past the tool for the best results.
    - The sensing needle's tip should extend over the tool's centerline.
    - The sensing needle should contact the tool at least 1.6mm from the tool's tip.
- Is the sensing needle supplied by Allora being used?
- Is the clamping collar tight on the PCS-100?
- Is the sensing needle assembly tight on the PCS-100?
- Is the set screw for the swing angle adjustment ring on the PCS-100 tight?
- Is the PCS-100 connected properly?
    - Color coded wires of cable should be attached to the correct terminals on the SCU-100.
    - Cable should be screwed tight to the PCS-100 connector.
    - The inside of the PCS-100 connector should be dry.

PCS-100 System
Trouble Shooting Guide
(cont.)

NO FAULT SIGNAL WHEN TOOL IS BROKEN (Given a fault condition, SCU-100 continues to give OK output.)

- Is there enough time set on the SCU-100 for the PCS-100 to reach its full swing angle?
- Have any objects that could obstruct the swing angle of the PCS-100 been removed?
- Is the clamping collar tight on the PCS-100?
- Is the swing arm assembly tight on the PCS-100?
- Is the set screw for the swing angle adjustment ring on the PCS-100 tight?
- With power disconnected from PCS-100, can the sensing needle be moved freely back and forth without any binding?
    - Look for metal chips which may be packed around the seals on the PCS-100 or between the PCS-100 and the swing arm assembly.
    - Look for large chip "bird's nests' that may be getting caught on the PCS-100.
- Is the PCS-100 set in the same direction as the CW/CCW switch on the SCU-100?
- Is the swing angle setting on the PCS-100 offset **at least 5º** from the 0º and 180º marks?
- Is the PCS-100 connected properly?
    - Color coded wires of cable should be attached to the correct terminals on the SCU-100.
    - Cable should be screwed tight to the PCS-100's connector.
    - The inside of the PCS-100 connector should be dry.
- The V-seal in the swing arm assembly provides additional protection against contaminants and should not be removed in most applications. The V-seal may however restrict the sensors motion when the swing rate is set on “LO”. If your application does not allow “HI” rate operation, you may remove the V-seal from the swing arm assembly to determine if this solves the problem.

NO POWER TO SCU-100 (No lights illuminated when SCU-100 is powered up and no power to PCS-100.)

- If 115VAC, is the power supply supplied by Allora being used?
- Is there a clean 24VDC being supplied to the Power terminals on the SCU-100?
- Is there no more than two SCU-100's running on one power supply?
- Is there 110-120VAC being supplied to the power supply?
- Is the power supply sending 24VDC to the power in terminals on the SCU-100?

NO OUTPUT FROM SCU-100

- Does the PCS-100 swing when the SCU-100 is given a start signal?
    - If not, see **SCU-100 Will Not Start**
- Is the red or green light illuminated and at its normal intensity?
    - If not, see **No Power to SCU-100**
- The outputs from the SCU-100 are momentary (500 ms.) Can your application use an output of this duration?
    - The outputs from the SCU-100 can be set to latch. (See Installation Instructions)
- With tool present, give the SCU-100 a start signal. Do contacts 11 & 12 close (or open momentarily depending on face plate settings.)?
    - This same check can be done for the fault output by removing the tool and checking across contacts 9 & 10.

NO POWER TO PCS-100

- Are one or more lights on the SCU-100 illuminated?
    - If not, see **No Power to SCU-100**
- Is the PCS-100 connected properly?
    - Color coded wires of cable should be attached tot he correct terminals on the SCU-100.
    - Cable should be screwed tight to the PCS-100 connector.
    - The inside of the PCS-100 connector should be dry.
- Manually move the sensing needle away from the start position. Does the sensing needle return to the start position on its own?
    - Is there approximately 4.1VDC across the blue and black terminals on the SCU-100? (The PCS-100 must remain connected to SCU-100 for this measurement.)
    - Is there 24VDC across the power terminals on the SCU-100?
        - If not, see **No Power to SCU-100**

Positive Contact Control Units conform with the EEC directive EMC 89/336/EEC as amended by 92/31/EEC and 93/68/EEC.

In compliance with the directive, the EC Declaration of Conformity and related Technical Documentation is maintained at the following address for inspection by the appropriate official

RoHS Compliant

Positive Contact – Hazardous Materials

All **Positive Contact** products and packaging are manufactured with RoHS compliant materials. They are free of Bromide Halogens (PBB, PBDE), Mercury, Cadmium, and Chrome 6+.
All **Positive Contact** products are Lead Free.
All **Positive Contact** products comply with current EU environmental standards, including directive amendments regarding the use of perfluorooctane sulfonates, (PFOS).
All **Positive Contact** products and packaging are free of any material containing Asbestos.
All **Positive Contact** foam packaging is free of CFC's, HCFC's or HFC's. The foam and its ash is non-toxic, landfill safe and recyclable.