

Figure 1. Integrated Machine Vision System

GENERAL OVERVIEW

The PS-OCR™II is designed to recognize the *TELESIS PSOCR* font. Additionally, it can read the OCRA font and the numeric characters of the OCRB font. This capability allows the Reader to both *read* and *verify* component identification markings.

Application and Usage

The key to a successful machine vision system is to control the site environment and other physical aspects of your specific application that might adversely affect its performance. *TELESIS* highly recommends that the PS-OCR™II be used as a character *verifier* and as a character *reader*. As a verifier, the Reader reports the *quality* of what was read. As a character reader, the Reader reports the *content* of what was read.

The verification camera(s) should be set up as close as possible to the area where the components are being marked. Verification features ensure that the marks adhere to a quality standard for well formed, readable characters. Early verification ensures readability and traceability of the component throughout the entire production cycle. If the quality of the marks become less than acceptable, the Reader will alert you to the degraded marks so that corrective action may be taken immediately. **Without verification, parts may be permitted to pass along the assembly line with unacceptable markings, resulting in wasted time and money.** This waste can easily be avoided if the Reader is properly positioned and configured for verification.

The read-camera(s) may be set up anywhere downline from the verify-cameras. The Reader can examine the character strings on the components and pass the information to a host computer or a logic controller. The computer or logic controller can then intelligently process the components based on their identification marks. The powerful read/verify features make the PS-OCR™II a very reliable tool in your process control system.

Operational Modes

The Reader may be operated in either Setup Mode or Run Mode.

Setup Mode – Setup Mode is used to configure the Reader’s operating software for your specific application. Setup menus and screens are displayed from which you can adjust the operating parameters.

Run Mode – In Run Mode, read and verify operations can be initiated using either discrete I/O signals or RS-232 communications. The Reader uses the operating parameters that were defined in Setup Mode and stored in the setup file. The results of the Reader’s operation are displayed on the monitor, reflected in the I/O outputs, and reported to the Host port. The results include a conformity level, a parameter that measures the quality of the character image. Run Mode can be automated to reduce the need for operator intervention. Manual entry capability is available to protect data integrity, allowing operators to enter data if the Reader fails to recognize characters on the marked components.

OPTIONAL ACCESSORIES

Optional hardware may be added to your Reader to provide additional features or functionality. Options may be supplied by the customer or provided by Telesis Technologies, Inc. Contact your *TELESIS* Sales Representative for more information.

Optional equipment includes:

- Keyboards
- RS-170 Monitors
- CCD Cameras
- Camera Lenses (application dependent)
- Camera Enclosures
- Camera Power Supplies
- Camera Power Cables (various lengths)
- Video Cables
- Illumination Equipment

PS-OCR™II SPECIFICATION SHEET

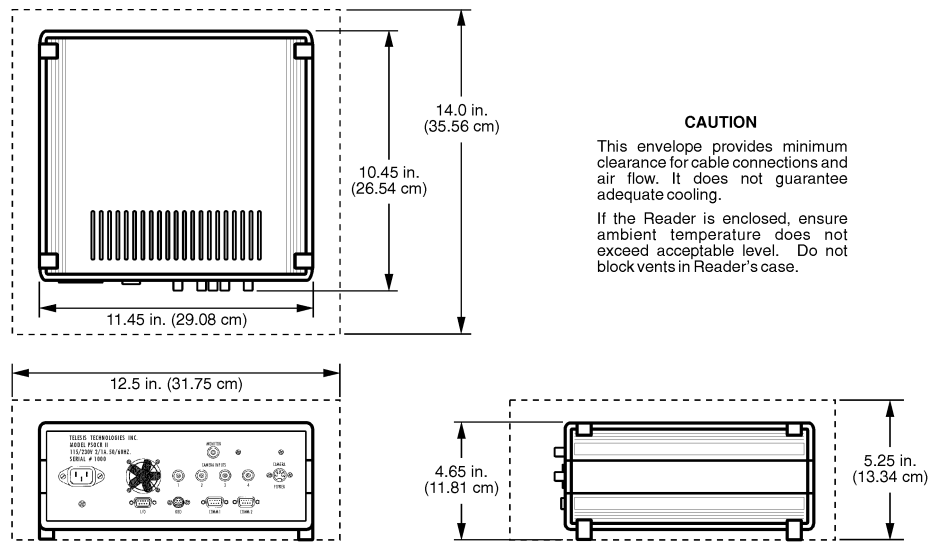


Figure 2. Reader and Surrounding Envelope Dimensions

SPECIFICATIONS

Reader Dimensions.....	11.45 x 4.65 x 10.45 in. (29.08 x 11.81 x 26.54 cm.)
Envelope Dimensions.....	12.50 x 5.25 x 14.00 in. (31.75 x 13.34 x 35.56 cm.)
Weight.....	6.0 lb. (2.7 kg.)
Power Requirements.....	95 to 260 VAC at 2 amps, 47 to 65 Hz
Camera Channels.....	Four (4) RS-170 Video
Read Windows	Four (4) per Camera
Serial Communication.....	RS-232 ASCII
Discrete I/O	12-24 VDC Input/Output (outputs drive up to 1/8 amp)
Rating.....	NEMA 1 (I.P. 30)
Temperature	+40° to 105°F (4° to 41°C)
Humidity	10% to 80%
Shock.....	30G/4 ms half sine-wave
Vibration	0.67G (5 to 500 Hz) random RMS

GENERAL SETUP

Typical installation consists of deciding the location of the equipment, placing the equipment, and connecting the video, data, and power cables. Because of the wide variety of applications for which the PS-OCR™II can be used, the circumstances of each installation are highly dependent on each site's requirements and preferences.

You will need to configure the Reader's setup for your particular needs. You will need to define windows for each camera. (A *window* is an area of the camera image that the Reader examines to read or verify the markings. You can define up to four windows per camera.)

Additionally, you will need to set the parameters for your Reader to communicate with a host computer and define the criteria that the Reader will use to perform its read and verify operations.

Installation Considerations

- The Reader *is not* a sealed unit. Protect it from potentially damaging conditions.
- If the Reader is installed in an enclosure, allow adequate ventilation; provide air conditioning if necessary. Do not block vents in the case.
- The read/verify station area *must* be free of contaminants that might obscure the optics.
- The mark being read *must not* be obscured by any contaminants (such as oils, mists, or sprays).
- Sufficient area must be available to mount the camera, enclosure, and light.
- Camera and lighting mounts must be secure, yet allow for adjustments.
- The distance from the camera to the mark being read should be as close as possible, typically about 12 inches (30.5 cm.).
- Marked parts must come to a stop long enough for the Reader to acquire an image, typically about 0.5 seconds.
- Parts at the read/verify station(s) should be presented consistently in the same horizontal, vertical, and lateral plane.
- The parts should not be skewed relative to the camera.
- The parts should be isolated from vibration or other mechanical inconsistencies.

Component Connections

If a host computer or a remote I/O controlling device will be used with the Reader, you must provide and wire the mating connector(s) for the appropriate interface.

INTERFACE CONNECTIONS

All connections for the Reader are located on the back panel. The Reader is typically connected to one or more video cameras. Optionally, the Reader may be connected to a keyboard, an external RS-170 video monitor, a host computer, or a remote input/output controlling device. Host computers and logic controllers must be supplied by the customer.

Camera Video Interface – Input connectors are provided to receive video signals from up to four cameras.

Camera Power Interface – A connector is provided to supply electrical power to one video camera. This eliminates the need for an additional power source if a single camera is used with the Reader. *TELESIS* can provide compatible connectors and pre-fabricated cables of various lengths. If supplied by the customer, the 5-pin DIN plug (mating connector) must be wired as:

Pin 1 +12VDC (750mA)	Pin 4 (not connected)
Pin 2 (not connected)	Pin 5 (not connected)
Pin 3 GND	

Monitor Interface – An output connection is provided for an optional, external, *non-terminated* RS-170 video monitor. The external monitor displays live video from the selected camera and is used to display the setup screens when configuring the Reader's operating parameters. Note: A monitor must be connected to the Reader to display the Setup Mode parameters and configuration options. However, a monitor is not required to operate the Reader in Run Mode.

Keyboard Interface – An input connection is provided for an optional, PC-AT style keyboard. The keyboard allows you to configure the Reader's setup parameters. Note: A keyboard must be connected to the Reader to access the Setup Mode and to change the parameters. However, a keyboard is not required to operate the Reader in Run Mode.

NOTE

The Reader ignores *all* RS-232 commands and *all* discrete input signals while in Setup mode.

RS-232 Interface – Two DB9P, RS-232 connectors are provided for serial communications between the Reader and a remote device. This interface permits commands from a host computer or an auxiliary device to control Reader operation. The customer-supplied DB9S (mating connector) must be wired as:

Pin 1 DCD	Pin 6 DSR
Pin 2 RXD	Pin 7 RTS
Pin 3 TXD	Pin 8 CTS
Pin 4 DTR	Pin 9 RING
Pin 5 GND	

Discrete Input/Output Interface – One DB9S I/O connector is provided for discrete input/output signals between the Reader and a remote device (such as a Programmable Logic Controller or other process control system). The customer-supplied DB9P (mating connector) must be wired as:

Pin 1 OUTPUT COMMON	Pin 6 NO READ
Pin 2 DONE	Pin 7 ONLINE
Pin 3 INPUT COMMON	Pin 8 SEL 1
Pin 4 SEL 0	Pin 9 START
Pin 5 (not used)	

Communications

The Reader is controlled by input commands it receives from a host computer and by discrete input signals as from a logic controller. The Reader returns the data it reads or verifies, I/O query responses, and error responses to the host. It also transmits discrete output signals to the I/O port. All interface connections are located on the back panel of the Reader, including those that transmit and receive the discrete I/O signals and RS-232 communications.

RS-232 Communications

Two connectors are provided for serial communications between the Reader and a remote device. The COMM1 and COMM2 connectors are standard RS-232 serial communication ports that use simple ASCII communications with XON/XOFF or RTS/CTS flow control.

The connectors may be defined during setup as a Host port or an Auxiliary port (but only one of each). Both ports can receive input commands, but only the one identified as the Host port will transmit output commands from the Reader.

The RS-232 commands may be used to control the Reader's operation. Available commands include:

START READ *	SET THE DATE
START VERIFY *	SET THE TIME
RESET THE SETUP PARAMETERS	UPLOAD WINDOW IMAGE
SET THE GOAL STRING *	UPLOAD A SETUP FILE
QUERY THE I/O STATES	DOWNLOAD A SETUP FILE

* Denotes commands that may be received by the Auxiliary port.

Discrete I/O Communications

An I/O connector is provided for discrete input/output signals between the Reader and a remote controlling device.

Input signals include: START, SELECT 0, and SELECT 1.
Output signals include: ONLINE, DONE, and NO READ.

Camera Selection. The Reader makes camera selections based on input signals received at I/O connector. The appropriate camera is selected based on the binary value of the two signals as shown below.

SEL 1	SEL 0	BINARY VALUE	SELECTED CAMERA
OFF (0)	OFF (0)	0 0	Camera 1
OFF (0)	ON (1)	0 1	Camera 2
ON (1)	OFF (0)	1 0	Camera 3
ON (1)	ON (1)	1 1	Camera 4

PS-OCR™II SPECIFICATION SHEET

UTILITIES

In addition to providing screens for setting up the Reader's operating parameters, the Setup Mode also provides you with several convenient utilities. These utilities include: defining an access password for the Setup Mode, copying setup parameters from one window to another, importing and exporting setup files to/from the host computer, freezing the live video display, uploading camera images to the host computer and monitoring the Reader's input and output signals.

The Password feature allows you to define (or change) the access password for the Setup Mode. This provides a measure of security for features and commands that should not be accessed by operator-level personnel. Without the proper password, access to the Setup Mode will be denied.

The Copy Window feature simplifies the process of defining each of the many read and verify windows. The Reader allows you to copy the parameters from one window to another window. After copying the parameters, you can change them to customize each window for your specific needs.

The Freeze utility allows you to preserve a "snapshot" of the live video image. When you select this feature, the monitor will retain the image it has displayed. The image will remain on the monitor until you command the Reader to re-display the live video.

The I/O utility allows you to view the Reader's discrete input/output signals. This feature monitors signals to and from the I/O connector on the Reader's back panel. You can verify the real-time input signals received by the Reader and test the output signals transmitted by the Reader.

NOTE

All upload and download utilities require that the host computer's terminal emulation program supports standard XMODEM file transfer protocol.

The Upload Image utility allows you to transmit the video image to the host computer. The video image is sent as a binary file to the host computer's default (receive-file) directory.

The Import/Export utility allows you to transfer setup files between the Reader and the host computer. Files imported from the host are stored in the Reader's library of setup files. Once imported, you can use the file command (from the main menu) to manage the setup file as you would any others stored in the Reader. Files exported from the Reader are written to the default (receive-file) directory on the host computer.