Radian Research, Inc.

Model 622
UTEC Calibrator

Operations Manual

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The equipment covered by this manual is intended for a specific application and it must be installed, operated and maintained by qualified persons who are thoroughly trained and who understand any hazards that may be involved.

WARNING: The equipment described in this manual contains high voltage. Servicing should be done by technically qualified persons with knowledge of the safety practices for such equipment.

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2. Notice of defect contains the following information: Product serial number, Product model number, date of original installation, and an accurate and complete description of the defect including the exact circumstances leading to the defect.
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INTRODUCTION

Welcome to the Model 622 Calibrator, the ultimate calibration tool for both the lab and test vehicle. Combined with the flexibility of the SysLink software, the 622 Calibrator provides a more intuitive and a more efficient testing method for the meter technician.

By combining the power of a personal computer with the 622, it is now possible to completely test, calibrate and program all functions of electricity meters. By creating all the necessary voltage and current wave forms the 622 is not dependent on the quality of the service voltage. This feature makes the 622 the ideal instrument for test vehicle applications that are powered from generators or inverters.

The test result accuracy of the 622 Calibrator is derived from the internal reference standard. The 622 is designed for use with summing type reference standards such as the Radian Research RM-10, RM-11, RM-15, RD-20 or RD-21 series. The reference standard can be easily removed for certification if required or be certified while installed in the 622. The 622 is capable of testing received and delivered quantities of Watts, Vars, Qs, VA, along with Volts, V^2, Amps, and I^2. The capabilities of the reference standard installed will determine the functions available. All electricity meters are tested with the voltage links closed (Closed-Link method) to speed the test and eliminate the danger of loss revenue resulting from installing revenue meters with open voltage clips. Because of the excellent stability and accuracy of the 622's sources, the reference standard can be continually monitored for any malfunctions.

User interface for the 622 is accomplished through an external personal computer

running Radian Research's SysLink software.

Before applying power to the 622, completely read and understand the operation manual. Information on the operating software can be found in the SysLink Software Manual.

INSPECTING AND UNPACKING

Remove the Model 622 from its shipping crate by removing the screws in the red band and lifting off the crate top.

Carefully cut the hold down bands. **Caution should be used as these bands are under tension and may fly when cut.**

After removing the calibrator from the shipping crate, a quick inspection should be performed before applying power to the 622. Remember to save all packing material. Should the system need to be returned for any reason it must be shipped in the original packing material and crate. If the system is returned in anything other then the original crate the warranty will be void.

With the unit out of the packing carton, perform a visual inspection for any shipping damage. Tip the unit from side to side to determine if there are any loose components inside the unit. Immediately report any shipping damage to Radian Research. DO NOT APPLY POWER IF ANY DAMAGE IS OBSERVED.

Customer Service 765-449-5500

ABOUT THE MANUAL

The 622 Calibrator manual is organized in several task-related topics; each chapter is made up of short sections, each of which covers a specific topic or technique. You can use this manual as a guide to learning the fundamentals of the 622 or as a quick reference when you need to find out about a specific topic. Here's a quick overview of the chapters and what they cover.

Specifications	The topic on specifications covers the hardware specifications of the 622 Calibrator. Specifications on the SysLink operating software can be found in the SysLink Software Manual.
Panel Layout	The panel layout topic will explain the various connectors and controls located on the 622. Pin out and connecting information is also provided.
Meter Test Socket	The test socket topic will explain the operation of the test socket provides with the 622.
Accessories	Because of the versatility of the 622, Radian Research provides many test accessories to simplify the connection of

	the calibrator to special test situations. The topic on accessories will discuss some of the more popular test accessories.
Universal Pickup	The Universal Pickup topic explains the operation and adjustment of the 622 optical system.
Optical Port Control	The Optical Port Control topic explains the operation of the optical port input.
A-Base Adapter	The A-Base adapter topic explains the operation and use of the 622 A-Base meter adapter.
Standard Removal	This topic explains how to remove the internal reference standard.

SPECIFICATIONS

System Accuracy

Total system accuracy for the 622 Calibrator is derived from the internal reference standard. Because the reference standard is in direct connection with the meter under test, the full rated accuracy of the reference standard can be used for the overall system accuracy. Therefore, the system accuracy is traceable to N.I.S.T. through the standard's manufacturer.

Throughout the design of the 622 several design concepts were adopted to insure the accuracy of the system. For example, the test voltage for the reference standard uses a Kelvin connection at the meter under test to eliminate any errors due to voltage drops in the voltage sense lines.

Unlike its competitors, the 622 uses a single current source for all three current phases and electronically compensated transformers to ensure balanced output currents regardless of their load impedance's. This is an often over looked source of errors when testing meters that have an element balance mismatch with the reference standard.

Service Voltage

The 622 Calibrator is designed to operate from a conventional 120 volt, single phase service. The power supply circuitry includes a power factor correction circuit to reduce the peak current required.

The power required by the 622 is dependent on the power the 622 sources are supplying to the load. Under no load conditions the quiescent power required by the 622 is about 40 watts and under fully loaded conditions the power requirement will not exceed 500 watts.

The 622 is protected by three fuses located on the back panel, one for the auxiliary

duplex outlet, one for the motorized meter socket and one for the calibrator itself. For continued protection from fire and other hazards, only replace fuses with the same type and value.

Meter Socket

The 622 is equipped with an automatic motor driven test socket for the quick and easy mounting of socket base meters. Designed for 200 amps continuous current, the meter socket will provide many years of reliable, maintenance free service. If contact surfaces become dirty, a clean dry cloth can be used to clean the surface. The moving parts within the socket are designed to run dry and do not require any lubrication. A switch is provided for selection of manual or automatic operation. See topic *Meter Socket* for more detail.

Test Voltage

The meter test voltage is under the control of the computer and is capable of the supplying the meter under test from 0 to 480 volts with a resolution of 0.1 volts. The accuracy of the voltage source is 0.5% and can be calibrated through software. To eliminate residual magnetizing in the meter under test, the test voltage is ramped up at the start of the test and ramped down at the end of the test.

The 480 volt dynamic range of the voltage source is accomplished in three output ranges, 0 to 120, 120.1 to 240, and 240.1 to 480. The maximum resistive power output is 80 VA at the top of the range and is linearly derated as follows:

0 - 120 Volt Range: VA = Output Voltage / 1.5
120.1 - 240 Volt Range: VA = Output Voltage / 3
240.1 - 480 Volt Range: VA = Output Voltage / 6

The voltage source is both current and thermally limited. Before the voltage is energized, a measurement is made to determine the presence of any outside voltage to eliminate the possibility of circuit damage. The voltage source can not be damaged by any accidental short circuit conditions.

Test Current

The meter test current is under the control of the computer and is capable of supplying the meter under test from 0 to 50 amps per phase with a resolution of 0.0125 amps. For special applications the three output currents can be placed in parallel for a maximum output current of 150 amps. The accuracy of the three current sources is 0.5% and can be calibrated through software. The accuracy is specified for a maximum load impedance of 0.5 ohms. To eliminate residual magnetizing in the meter under test, the test current is ramped up at the start of the test and ramped down at the end of the test.

Each of the three current outputs is capable of supplying a maximum of 1 volt at the output terminals throughout the 50 amp range.

Like the voltage source, the current source is fully protected. Before the current circuit is closed a measurement is made to determine the presence of any outside voltage to eliminate the possibility of circuit damage. The current source can not be damaged by any accidental open circuit conditions.

Synthesizer

The synthesizer provides the 60Hz (or optional 50Hz) wave forms to the voltage and current amplifiers. The wave forms are synthesized asynchronous from the service voltage with 16 bit accuracy at a sampling rate of 115KHz. The phase angle between the voltage and current wave forms is controlled by the synthesizer and can be set from 0 to 360 degrees in steps as small as 0.1875º. The accuracy of the phase angle is 0.5º and can be calibrated through software in the hwcal.def file.

KYZ Pulse Inputs

The 622 is equipped with six KYZ input channels. The Y and Z inputs on each of the six channels has an internal voltage source of 15V and is current limited to 1mA. When using the KYZ interface the meter under test must be disconnected from the installation. Channel 1 is connected to the front panel binding post and to the Meter Socket.

KYZ Pulse Output

A KYZ pulse output channel is provided on the KYZ interface. The maximum open circuit voltage is 350V peak AC or DC. The maximum current is 100mA. The KYZ Output requires optional Manual Control Software for operation.

Universal Input

The universal input is designed to be used exclusively with Radian Research pick-up accessories. Radian Research supplies a variety of pick-up accessories for sensing meter pulses including disk edge, infrared light, visible light, and even the time honored hand switch. An audio beep is sounded each time the photo pulse is received. A volume control is provided for controlling the audio for no output to full output.

Optical Probe Input

Provided on the front panel is a Optical Probe input. This input can use a Abacus Optical Probe as a photo input control to the 622 or be computer switched to a serial port on the control computer to be used with 3rd party software such as meter programming software.

Digital Input

A BNC connector is provided to accept high frequency pulse rates up to 4MHz. The

high frequency input is mainly used for testing modern reference standards and other high frequency devices.

The digital input has an internal pull-up resistor that can be software programmed to 10K, 1K, or 150 ohms. The pull-up voltage is 5V. When connecting the digital input to non-open collector devices such as TTL circuits, set the pull-up value to 10K.

Digital Output

A digital pulse output is provided on the digital out interface. The output is of the open collector type and has a maximum voltage rating of 20V DC. The maximum current should be limited to 100mA. The Digital Output requires optional Manual Control Software for operation.

Analog Input

The analog input is designed for measuring DC current loop signals. The maximum input current should not exceed 25mA. The analog input has an internal burden of 250 ohms. The Analog Input requires optional Transducer Testing Software or Manual Control Software for operation.

Analog Output

The analog output is capable of providing a DC current for testing current loop circuits. The current range is 0 to 20mA with a resolution of 5uA. The analog output has a compliance voltage of 15V. The Analog Output requires optional Transducer Testing Software or Manual Control Software for operation.

Interface

The 622 is controlled via an external computer through a standard 9-pin, RS-232, serial communication port. The 622 is set for a fixed data rate of 9600 baud and a data format of 8 data bits, 1 start bit, 1 stop bit and no parity.

Environment

The system requires good ventilation. Place it where air can circulate freely around it, and avoid locations in direct sunlight or near heaters or lamps. Never block the cooling fan openings. Operating temperature should be limited between -10 and +55 degrees Celsius.

Enclosure

The 622 Calibrator in enclosed in an attractive and durable enclosure measuring approximately 24 3/8 inches wide, 17 1/2 inches deep and 18 1/2 inches high. The overall weight of the 622 including a Radian reference standard is approximately 125 pounds.

Supplied with the unit are four leveling feat that can be screwed into the bottom of the enclosure to provide leveling if necessary.

PANEL LAYOUT

The 622 Calibrator was designed with simplicity in mind. Every effort was made to provide maximum flexibility with a minimum of external connections. Many of the connectors on the front panel of the 622 consolidate multiple functions into a single connector and are configured through software.

The topics in this chapter will explain the various connectors and controls found on the 622 Calibrator. In addition to explaining their functions, connection and pin-out information will also be given where applicable. For information concerning the programming of the programmable features consult the SysLink Operations Manual for the control software.

Environmental Considerations

The Model 622 Calibrator has been engineered to provide many years of reliable service. However, it should given it the same reasonable care and protection that would be given any other piece of electronic computer equipment.

The system requires good ventilation. Place it where air can circulate freely around it, and avoid locations in direct sunlight or near heaters or lamps. Never block the cooling fan openings. To prevent fire or shock hazard, do not expose the calibrator to rain, snow, or moisture. Finally, avoid locations with high levels of dirt, dust, or smoke.

Power

The 622 is designed to operate from a standard 120 volt single phase service. The power entry module is located on the back panel along with the fuses. The 622 is protected by three fuses, one for the auxiliary power outlets, one for the motorized meter socket and one for the calibrator itself. For continued protection from fire and other hazards, only replace with fuses of the same type and rating.

The meter socket can be operated from the front panel switch whenever the calibrator is plugged in. The calibrator needs to be turned on to operated the meter socket. Some meter sockets are equipped with an automatic closing feature. This is an optional feature.

When the 622 is turned on, there will be a short delay of about three seconds. If for any reason power to the 622 should become interrupted turn the 622 off for ten seconds before reapplying power. The 622 must be energized before starting the SysLink Control Software.

Interface

Control of the 622 Calibrator is accomplished with the use of an external computer via

an RS-232 compatible serial communication port located next the power connector on the back panel. Using a standard pin-to-pin RS-232 cable, the 622 can be connected directly to the external computer through any standard RS-232 communication port with a DB-9 style male connector. The 622 is configured for a data rate of 9600 baud with 8 data bits, 1 stop bit and 1 start bit. Parity checking and generation is not used on the 622.

620 Calibrator COM A		Computer		
Pin #	Description	Pin # (DB9)	Pin # (DB25)	Description
2	TD	2	3	RD
3	RD	3	2	TD
5	GND	5	7	GND
7	CTS	7	4	RTS
8	RTS	8	5	CTS

For proper operation of the 622, the control software must be configured for use with a remote device driver and have the test station option set to yes and port C. See SysLink help for additional details.

Meter Connector

All non socket base meter connections to the 622 are made through a socket base plate adapter. This socket base plate is optional and is required for performing standardization testing.

POTENTIAL

Test voltage for the meter under test is synthesized by the calibrator and is identified as “potential” on the socket base plate adapter. Through the SysLink operating software the potential can be set from 0 to 480 volts in .1 volt steps. In order to achieve maximum accuracy, a second set of voltage connections named “sense” has also been provided. The sense connections provide the measurement potential to the internal reference standard. This Kelvin connection at the meter under test eliminates measurement errors due to voltage drops in the potential lines.

A high voltage indicator is provided above the meter connector. The high voltage indicator will be illuminated whenever the calibrator is providing voltage to the potential lines.

CURRENT

Test currents for the meter under test are synthesized by the calibrator and are identified as currents A, B, and C on the socket base plate adapter. Through the SysLink operating software the test current can be set from 0 to 50 amps in .0125 amp steps. Each of the three test currents are isolated from each other for use in closed link testing. For special applications the three current sources can be

paralleled for a maximum current of 150 amps.

A current indicator is provided above the meter connector. The current indicator will be illuminated whenever the calibrator is providing current to the meter under test.

KYZ Interface

The 622 Calibrator provides for up to six channels of KYZ signals from the meter under test. With six channels each function of the meter can be connected to a separate channel to allow for hands free testing of all the meters functions. The 622 will test both two and three wire circuits. Each Y and Z input has an internal voltage source of 15 volts DC and is current limited to 1mA. When testing using KYZ initiators the meter under test MUST be disconnected from the installation. All KYZ channel lines are fused to prevent damage to the equipment should high voltage be applied to the inputs.

In addition to being routed to the DB-25 connector, KYZ channel 1 is also routed to the meter through the meter socket as well as to the three front panel binding post.

Along with the six input channels, the KYZ interface also provides one output channel that can be used to repeat any of the six input channels to drive other equipment or it can be programmed to deliver a specified number of pulses for testing recorders. The maximum open circuit voltage for the output channel is 350 volts peak AC or DC. The maximum switch current is 100mA.

The pin out of the KYZ interface is as follows:

Pin 1 – Y1	Pin 6 – Z2	Pin 11 – NC	Pin 16 – Z4	Pin 21 – K6
Pin 2 – K1	Pin 7 – Y3	Pin 12 – Y Out	Pin 17 – Y5	Pin 22 – Z6
Pin 3 – Z1	Pin 8 – K3	Pin 13 – Z Out	Pin 18 – K5	Pin 23 – NC
Pin 4 – Y2	Pin 9 – Z3	Pin 14 – Y4	Pin 19 – Z5	Pin 24 – NC
Pin 5 – K2	Pin 10 - NC	Pin 15 – K4	Pin 20 – Y6	Pin 25 – K Out

Universal Interface

Radian Research offers a multitude of pick-up accessories for use with the 622 Calibrator. Among the available types of pick-up devices are infrared and visible light pick-ups, disk edge sensors, hand switches, and other specialty pick-ups. Contact the Radian Research sales team for a complete listing of pick-up devices. See the topic Universal Pickup for more detail.

In order to simplify test setup all of the pick-up accessories have been designed with a common connecting plug. No matter what type of pick-up you need they all plug into the universal interface.

In addition audio and visual feed back is supplied the user for each detected test pulse from the meter. A volume control is provide to adjust the audio level for nothing to full output.

Optical Probe Input

A Optical Probe Input is provide for using a Abacus Optical Probe as a photo input to the 622. For solid state meters that have the test pulse emitted from the Class II optical port, this is very convenient. The optical probe can be automatically switched from being a photo input to a RS-232 on the control computer so that 3rd party software can be used for reading and programming the meter. This feature provides for testing, reading and programming the meter without having to remove the optical probe.

Digital I/O

The 622 includes two BNC connectors under the heading of "Digital I/O". The Digital I/O connectors are used to transfer digital pulse information in and out of the calibrator.

DIGITAL IN

The "Digital In" BNC is designed for high speed digital pulse data. The digital input is capable of handling pulse rates from DC up to 4MHz. More than adequate for testing high frequency reference standards.

Designed for use with open collector type devices the digital input is equipped with an internal 5 volt supply and pull-up resistor. To accommodate existing equipment the internal pull-up resistor has a programmable value of 10K, 1K, or 150 ohms. The pull-up resistor value is set through the operating software. The digital input can also be interfaced with TTL circuitry without damage by programming the pull-up resistor to 10K.

DIGITAL OUT

Under the control of the optional Manual Control Software, the "Digital Out" BNC can be programmed for a variety of functions. Some of the functions include a programmable divider that can divide pulses from the reference standard or any other input such as the universal or KYZ interface. A standard control signal that can be used for gating two or three cycle displays on external standards. A programmable pulse generator for testing recorders or to simply pass the internal reference standards pulses through.

The digital out BNC has an open collector type of output and has a maximum current rating of 100mA. The maximum open collector voltage rating is 20V DC and is zener protected.

Analog I/O

Analog signals are transferred to and from the calibrator via the "Analog In" and the "Analog Out" BNC connectors. The analog signal capability of the 622 is designed for use with DC current loop signals. The analog testing function is optional with the model 622. These Analog features require optional Transducer Testing Software.

ANALOG IN

The “Analog In” BNC is designed for a maximum current input of 25mA and has several gain ranges to accommodate all current loop scales and offsets. Under the control of the optional Transducer Testing Software the analog in signal can be used for testing analog transducers and current loop verification.

ANALOG OUT

The “Analog Out” connector is capable of providing a DC current for testing current loop circuits. The current range is 0 to 20mA with a resolution of 5uA. The analog output has a compliance voltage of 15V. Requires the optional Transducer Testing Software for operation.

Computer Ports

Two pin-to-pin computer ports are provided from the back panel to the front panel for connection of accessories such as bar code readers etc. These ports provide a straight through connection from the back of the 622 to the front panel and eliminate the need to have cords reaching from the back of the system.

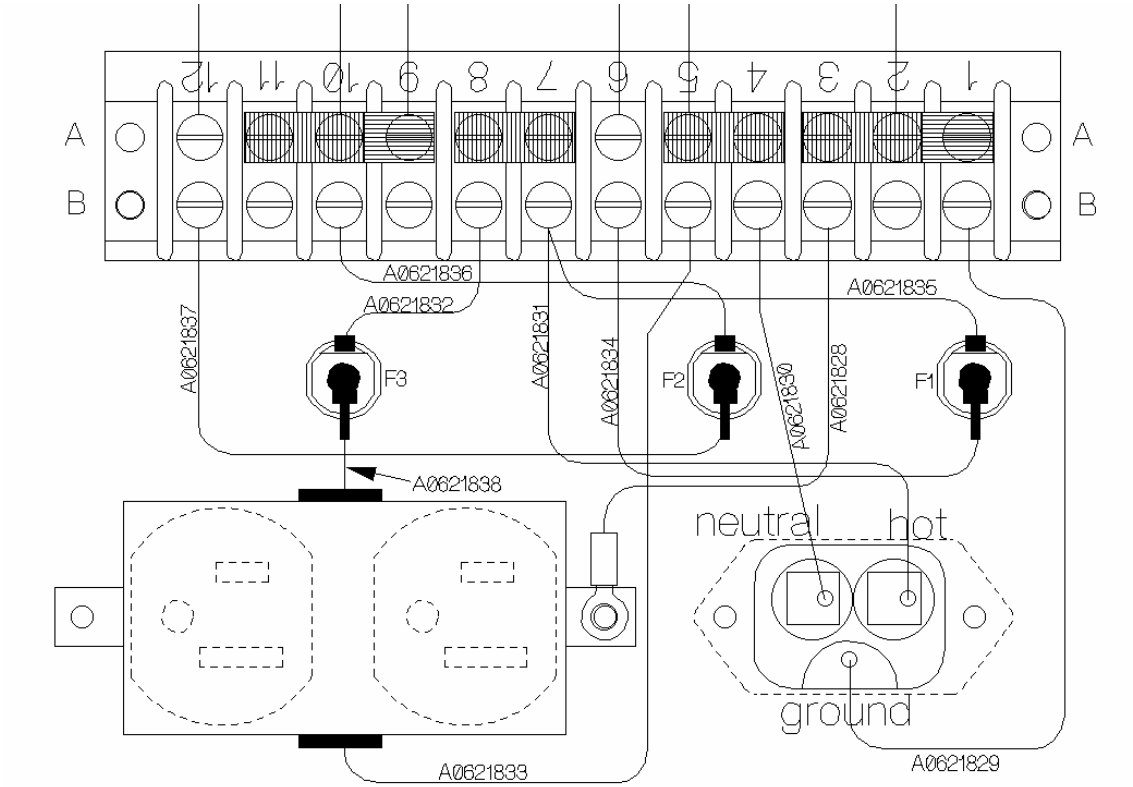
Auxiliary Power Plugs

Two auxiliary power plugs are provide, a single plug on the front panel and a duplex plug on the back panel. Both are rated and fused for 5 amperes maximum operation. Both are wired after the input filter to the 622.

The front single power plug is switched ON and OFF with the 622 system power switch.

The rear duplex power plug is not switched ON and OFF with the 622 system power switch and remains ON all the time the 622 input power cable is energized as shipped from the factory. This duplex power plug can be switched ON and OFF with the 622 system power switch by moving a jumper on the terminal strip mounted to the back panel.

To change the rear duplex to be switched ON and OFF with the 622 system power switch, remove the jumper between terminals 7 and 8 and place it between terminals 8 and 9.



METER TEST SOCKET

The 622 equipped with a motor driven test socket for the quick and easy mounting of socket base meters. Designed for 200 amps continuous current, the meter socket will provide many years of reliable, maintenance free service.If contact surfaces become dirty, a clean dry cloth can be used to clean the surface. The moving parts within the socket are designed to run dry and do not require any lubrication.

The design provides for manual or automatic operation.

A locking toggle switch is provided at the bottom of the front panel for selecting between the two modes of operation. The toggle switch has a locking handle so that it can not be accidentally operated. To change positions, pull out on the toggle handle and while holding the toggle handle in the pulled out position, move it to the desired location. Release the toggle handle and the switch automatically locks.

In the MANUAL position, the meter test socket is opened and closed using the *Socket* switch to the left of the meter test socket. Large LEDs indicate the position of the meter test socket as Open or Closed. Some meter bases do not conform to ANSI C12.1 and therefore will not properly operate the automatic function of the meter test socket. In these cases, the manual function should be used.

In the AUTO position, the meter test socket is closed automatically when the meter is properly seated into the meter test socket. The meter test socket is Opened using the *Socket* switch to the left of the meter test socket.

ACCESSORIES

Radian Research manufactures a wide variety of accessories for use with the 622 Calibrator. Among the accessories are various test cables, pulse sensing pickups, and specialty cables. This topic will discuss some of the more popular accessories.

New accessories are constantly being added as new applications develop. If you have a unique application contact the Radian Research sales team to see if we can help.

Sensors

Universal Pickup	The Universal Pickup provide a Thru-hole, Reflective and IR pickup in one unit. See topic Universal Pickup for more detail.
364 Disk Sensor -	The 440-36 Disk Sensor is a modulated reflective sensing device for picking up disk revolutions from mechanical meters. The disk sensor works by aligning the device so that the red beam of light from the sensor makes a focused spot on the edge of the meter disk. A red LED on top of the sensor indicates a valid pulse from the black flag on the meter disk. Best results are obtained by placing the sensor 2 to 3 inches from the disk at a 5 to 10 degree angle.
365 IR Pickup	Infrared suction cup pickup for general purpose use with solid state meters. The 440-41 includes an ambient light filter to block out sunlight and has a peak sensitivity wavelength of 980nm.
360 Visible Light Pickup	General purpose light sensor for use with solid state meters. The 360 Visible Pickup is designed to detect both infrared and visible light pulses.
711-08 Optical Port Adapter	The 711-08 optical port adapter allows the 440-41 suction cup pickup to be used with meters that have the test pulse in the center of the Class II Optical Port.
440-39 L&G PDR-A Pickup	Infrared calibration pulse pickup for Landis and Gyr PDR-A meters.
440-40 L&G CTR Pickup	Infrared calibration pulse pickup for Landis

	and Gyr CTR meters.
Abacus Optical Probes	Abacus Optical Probes A6Z-P-C09F-2A and A7Z-P-C09F-2A for use as photo inputs and programming and reading heads.

Pulse Cables

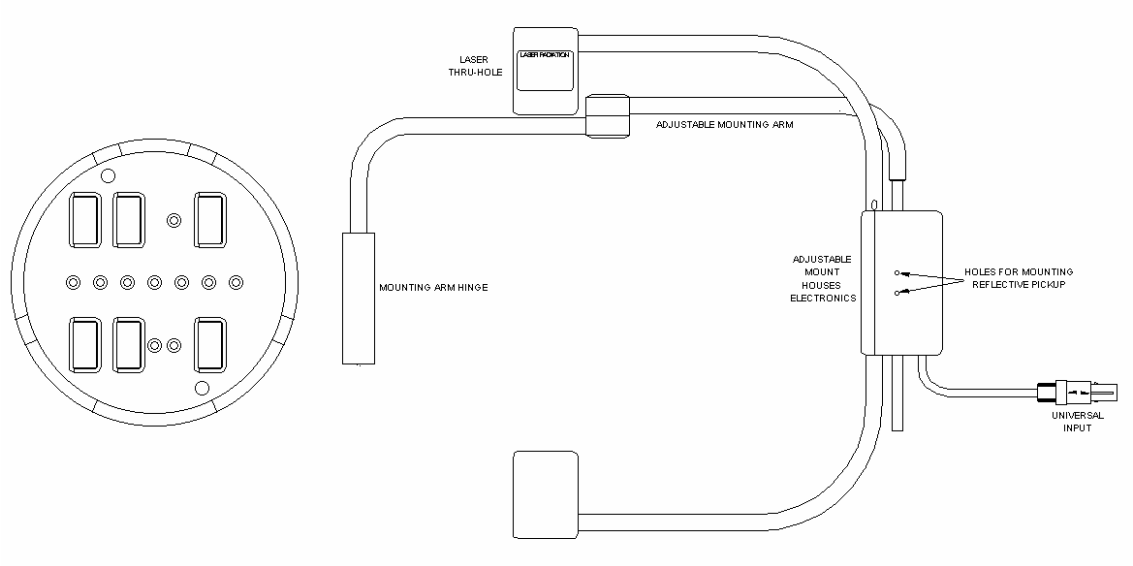
440-16 I/O Cable Set	I/O adapter cable set consisting of one of each of the following: 6 foot BNC to BNC cable; 8 foot BNC to test clips cable; 8 foot BNC to spade lugs cable; 8 foot DB-9 to DB-25 serial cable; 6 foot Centronics parallel cable; DB-25 to DB-25 KYZ cable; KYZ breakout block.
440-18 Hand Switch	The 440-18 is a push button hand switch that interfaces with the universal input of the calibrator. The hand switch can be used for manual meter testing and for the start of interval signal on demand test.
440-21 KYZ Breakout	The KYZ breakout adapter and cable converts the DB-25 KYZ interface on the calibrator to individual screw type terminals.

UNIVERSAL PICKUP

The model 622 is supplied with a Universal Pickup that provides for detecting the test pulse of the meter by using a Thru-Hole Digital Laser, Reflective and Infrared (IR) photo detector. The Thru-Hole and Reflective assemblies are mounted to a rod and hinge system which allows adjustment from side to side of the meter test socket and in and out from the panel. The Infrared photo detector mounts directly to the meter under test.

THRU-HOLE DIGITAL LASER PICKUP

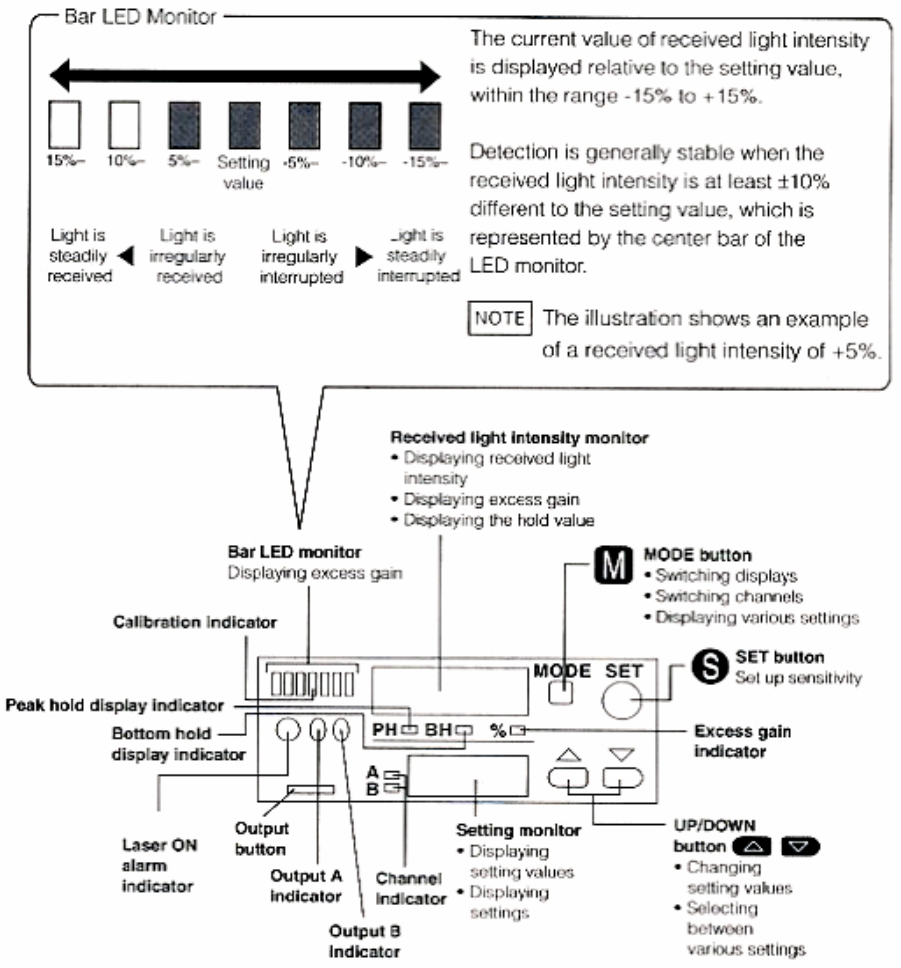
The Thru-Hole Digital Laser Pickup assembly is shown below.



The Thru-Hole pickup uses a class 2 laser product. The transmitter (top unit) has a warning label listing the specifications of the laser unit.

WARNING!! DO NOT LOOK DIRECTLY INTO THE LASER BEAM OR REFLECTIONS OF THE LASER BEAM. LOOKING DIRECTLY AT THE LASER BEAM OR REFLECTIONS OF THE LASER BEAM MAY RESULT IN SERIOUS EYE INJURY.

Listed below are the various controls and indicators located on the Thru-Hole Digital Laser Pickup.

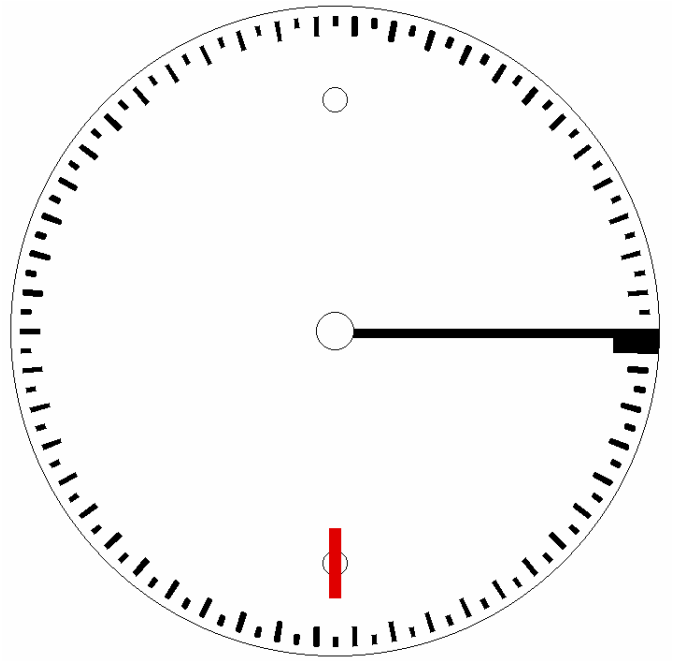


Calibration Of Thru-Hole Digital Laser Pickup

No calibration of the thru-hole digital laser pickup should be required. Calibration is set and locked at the Radian Research factory. Should pickup problems occur, call Customer Service at 1-800-952-8832 for assistance.

Alignment of Thru-Hole Digital Laser Pickup

The Thru-Hole Digital Laser Pickup emits a bright red slit beam about 3/8" long. This beam should be placed over the anti-creep hole in the meter disk as shown below.

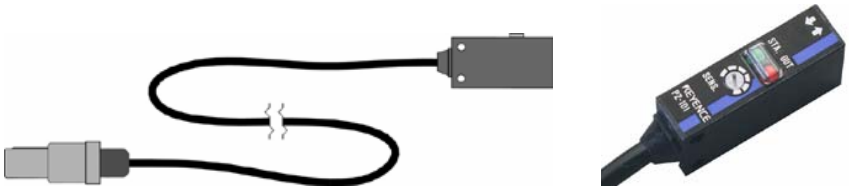


Maintenance Of The Thru-Hole Digital Laser Pickup Assembly

There is no periodic maintenance which must be performed on the Thru-Hole Digital Laser Pickup assembly

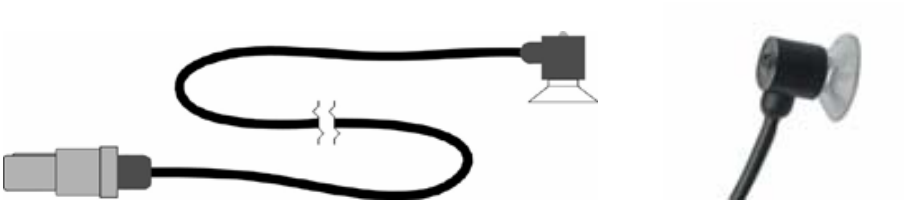
DO NOT LUBRICATE THE ROD AND HINGE they are designed to operate without lubrication.

REFLECTIVE PICKUP



The Reflective Pickup is a modulated red led type photo head. It mounts on the same support arm as the Thru-Hole assembly. The Reflective Pickup is designed to reflect off of the edge of the meter disk and detect the black flag. The face of the Reflective Pickup unit should be 2 to 3 inches from the edge of the meter disk and adjusted at an angle of between 5 and 10 degrees from straight in as shown below. The Reflective Pickup is supplied with its own mount, but can be removed from the mount and attached to the Thru-Hole mounting assembly.

INFRARED PICKUP



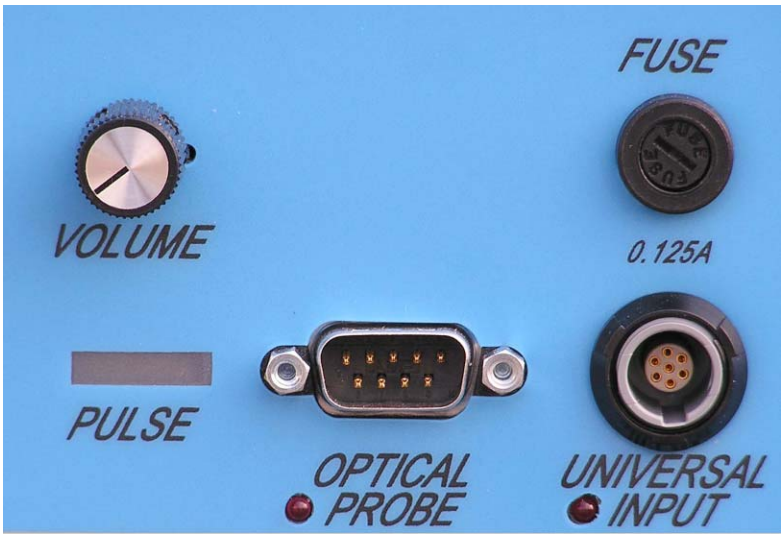
The Infrared Pickup is designed to detect the infrared test pulses emitted from solid state meters. Some meter designs provide a test pulse LED on the face of the meter. For this type meter stick the suction cup of the Infrared Pickup to the meter cover centered on the test pulse LED.

Other meters provide the test pulse through the Class II optical port of the meter. For these types of meters, the optional Model 711-08 Optical Port Adapter is needed. The optical port adapter is designed with a magnet that attaches to the Class II optical port housing and provides a smooth optical surface for the suction cup to stick to.

An alternate method of detecting the infrared test pulse is to use the Optical Port Control feature supplied with the 621 and 622. When using this feature, the meter data ports can also be accessed using 3rd party software. See topic Optical Port Control for more detail.

Optical Port Control

If the test pulse is emitted from the Class II Optical Port of a solid state meter, it can be used to control the meter test by using an Abacus Optical probe.



The Optical Control is selected from the drop down menu of the Control Input section of the Test Point setup.

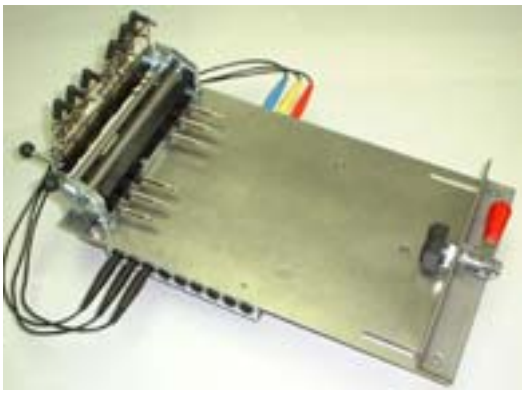
Only Abacus Optical Probes models A6Z-P-D09F-XA and A7Z-P-D09F-XA (X = 1 for 1 meter long cable, 2 for 2 meters and 3 for 3 meters) may be used.

Radian Research keeps a stock of these Optical Probes.

The SysLink Control software provides for using the optical probe for testing and provides switching control to call 3rd party software for reading and writing the meter.

UNIVERSAL A-BASE ADAPTER

The Model 204 Universal A-Base Adapter is designed to accommodate almost all bottom connected meters including those not manufactured in the U.S. The adapter is pictured below

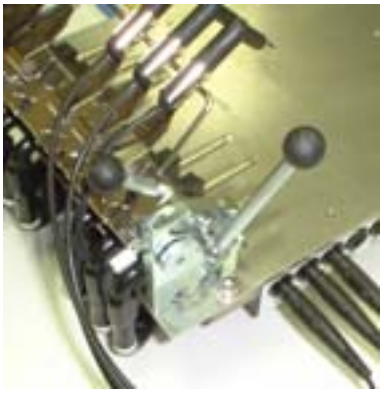


The Adapter is mounted to the Model 620/621/622 via the 13 terminal socket base on the back. To mount the adapter, open the test socket and position the adapter so that the anchor block shown below seats firmly in the black anchor bushing located above the test socket.

Using the 5/16" Tee Handle Hex Key provided, tighten the captive screw. When the

screw is near tight, the click of a switch will be heard. This switch tells the computer that the adapter is mounted and to change the socket and safety control over to the adapter. Push down on the bottom of the adapter, so as to seat it against the test socket locating ring, and close the test socket. Plug the control cable into the "Adapter Interlock" located to the top left of the adapter.

Open the lock handle for the current conductors and adjust the number and position to match the meter being tested. When positioned, lock the clamping handle. Connect the voltage connections as outlined in the table below.



Make certain that all of the current connection screws in the meter are tightened all the way down and the connection screw is filling the wire entrance in the meter base. Place the meter on the current connections and raise the clamp handle to the center position. Loosen and slide the clamp bar down until the clamping foot touches the meter. Tighten the clamp bar. Move the clamp handle to push down on the meter and current connections. The current connections should move down approximately ¼". The adapter is now adjusted for the meter.

The numbers on the left and right side voltage connection blocks are according to

ANSI C12.10 which is shown in the wiring help of SysLink Control. Adjust the voltage connection probes to match the meter base plate and connect to the appropriate voltage position on the left or right connection blocks.

The “adapter closed” signal is provided by the microswitch operated by the leaver attached to the voltage connection rack. When the rack is closed and the voltage connections made to the meter, this switch is overcome and sends a signal to the computer that the voltage can be raised to perform the test.

Should either the voltage connection rack not close, or the leaver attached to it be bent, or the microswitch leaver be bent or broken, a message will be issued by the SysLink software that the “Test Socket is Open” and testing can not proceed.

A-BASE FORM	PROGRAMMED S-BASE FORM	CURRENT +	CURRENT RETURN	VOLTAGE +	VOLTAGE RETURN	K	Y	Z
1	1	1	2	1	3			
2	2	1, 4	2, 3	1	3			
3	3	1	2	3	12			
4	4	1, 4	2, 3	12	16			
5	5	1, 3	2, 4	9, 8	10, 7	*	*	*
6	6	1, 10, 3	2, 9, 4	11, 12	17, 16	13	14	15
8	8	1, 10, 3	2, 9, 4	11, 13	12, 17	14	15	16
9	9	1, 9, 3	2, 10, 4	11, 12, 13	17, 17, 17	14	15	16
10	10	1, 9, 3	2, 10, 4	11, 12, 13	17, 16, 15	*	*	*
11	11	1, 9, 3	2, 10, 4	11, 12, 13	17, 17, 7	14	15	16
12	12	1, 3	2, 4	1, 3	7 or 12	*	*	*
13	13	1, 3	2, 4	9, 8	10, 7	*	*	*
14	14	1, 10, 3	2, 9, 4	1, 3	7	*	*	*
15	15	1, 10, 3	2, 9, 4	1, 3	9, 7	*	*	*
16	16	1, 9, 3	2, 10, 4	1, 9, 3	7	*	*	*
17	16	1, 9, 3	2, 10, 4	1, 9, 3	7	*	*	*
* Use External System Channel 2 KYZ input for 441, 620, 5800								

Removing Voltage and Current Contacts

Some meter forms do not require all 6 voltage contacts nor 8 current contacts. When testing these forms, the unused contacts should be removed from the Universal Adapter.

To remove voltage contacts, simply slide them from the spring holder and put aside. This is most easily done with the voltage rack in the open position.

To remove current contacts, loosen the current contact clamp, and slide the black clamp jaw all the way to the clamp handle end of the assembly. Slide the first current contact to the left and when it clears the black clamp jaw, turn slightly to release it from the metal clamp jaw. Then pull out the current contact. The current contacts must be removed one at a time in this fashion. Reassemble the current contacts using only those necessary for the form to be tested. The unused current contacts will now hang below the adapter. Red insulator boots are supplied to cover the exposed connection rod while in the unused position. These boots should be used on all unused current contacts as there is a possibility of them having live voltage during the test.

STANDARD REMOVAL

If required, the following procedure can be used to remove the internal reference standard for repair or calibration.

WARNING - REMOVE ALL POWER FROM THE 622 BEFORE REMOVING THE BACK PANEL

1. To gain access to the mounting screws on the bottom, use blocking to raise the 622 (2x4s work well).

2. Using a hex wrench, remove the two inner screws from the bottom panel.

3. Remove the blocking and then remove the two screws from the center of the back panel as well as the screws around the perimeter of the back panel.

4. Slowly tip the top of the back panel out and disconnect the 9-pin communication cable as well as the 6-pin power cable.

5. With the back panel removed, disconnect all the cables from the main unit and pull it from the enclosure.

6. With the main unit sitting outside the enclosure, remove the end panel from the unit on the standard side and remove the 4 standard mounting screws from the bottom of the unit.

7. Disconnect the BNC and control cable from the standard and slide the standard out.

8. Disconnect the voltage and current cables from the standard.