Heat Treating Equipment Products Catalog

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Power Source

Description

The ability to control temperatures precisely is the key to accurate heat treatment. The Team Industrial Services, Inc. (TISI) XTX 6-Way control console is the most advanced heat treatment console in the industry. It delivers the latest in digital control and data collection, featuring a 10-inch touchscreen that combines the controllers, recorder and programmer into one device. The XTX can be operated in two different modes for optimal user control: Advanced and Basic. Advanced mode provides six independently controlled, low voltage, high current outputs that precisely control the work piece temperature and provide the ultimate option for virtually any heat treatment application. Basic mode operates as a single setpoint programmer for all six zones to run the same program.

Operator Interface

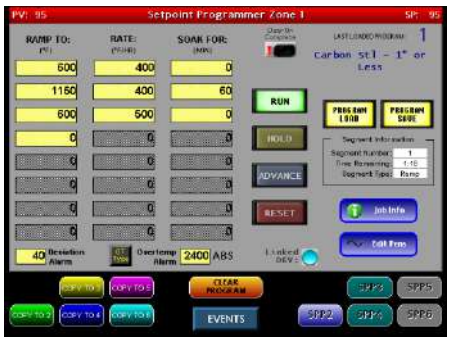
The 10-inch touchscreen user interface can be controlled locally at the machine or remotely via a password-protected web page on a networked computer. The XTX interface software is programmed for operation in English or Spanish. There are eight softkeys for easy menu access from any screen view. The color-coded indicators across all program screens facilitate identification and meaning for the control and monitor thermocouples per zone.

Benefits

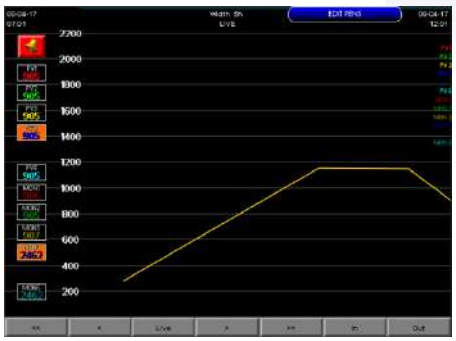
The XTX's interface was designed to be intuitive for the users which saves training time and operator errors. There is an on-board help function for quick reference in all screens for immediate assistance when needed. The XTX is capable of saving customer-designed heat cycle programs for quick recall for repetitive jobs, saving time and potential entry errors. User-designated job information is used to preserve the security of the temperature data.

Viewing Charts

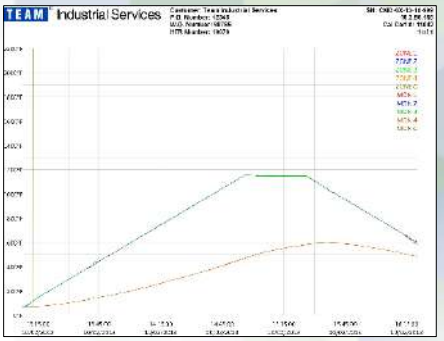
Log files are downloaded to a USB flash drive or directly to a networked computer (using the TeamScada Downloader) to be viewed using the included TeamScada View software. Simply select the specific job information by date and then customize the view of the chart as needed. A completed chart can be printed or emailed as well as saved for historical backup information for a project.



Setpoint Programmer Screen View in Advanced Mode on XTX



Trend Chart Screen View on XTX



View of Printed Chart created using TeamScada View Software

Power Source

Whether it is the latest XTX 6-Way or a traditional discrete controller machine, all units are built with the same safety and power features. Although there are some feature variations available for the traditional 6-Way machines, the XTX unit includes all the variable control and recording options in one machine.

Specifications

Mechanical

Weight	850 – 900 lbs.
Depth	24 inches
Width	24 inches
Height	48 inches (56 inches with casters)

Electrical

Input Voltage	380/415/440/480/575VAC
Output Voltage	65/85VAC
Power Out	72KW fan-cooled

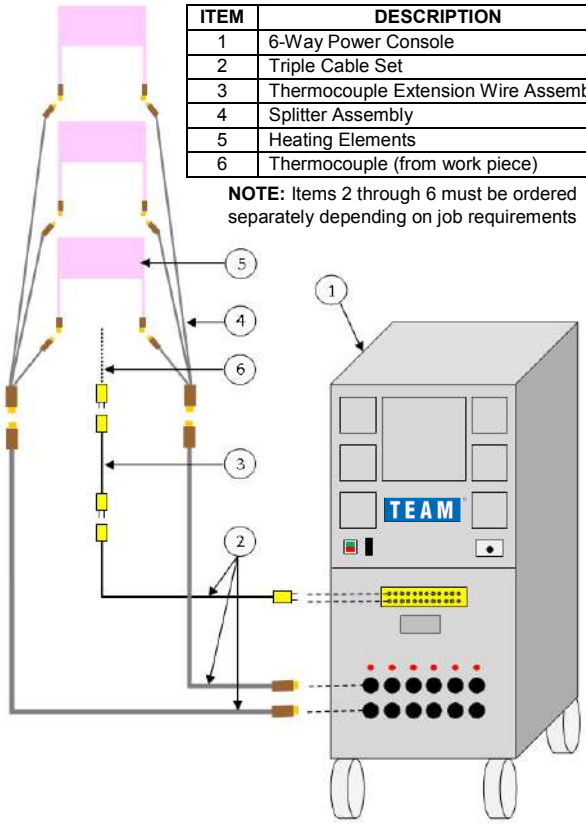
09010104

Safety Is Built In

- 125-Amp circuit breaker for primary power connection
- 5-Amp circuit breaker safety switch in case of overloading on control circuit
- ¾-Amp circuit breaker protection for each secondary (zone) contactor
- Over-temperature protection of main transformer coils (275°F/135°C temperature trip)

ITEM	DESCRIPTION
1	6-Way Power Console
2	Triple Cable Set
3	Thermocouple Extension Wire Assembly
4	Splitter Assembly
5	Heating Elements
6	Thermocouple (from work piece)

NOTE: Items 2 through 6 must be ordered separately depending on job requirements



Features

- Enclosure – The stainless steel enclosure is supported by a 1 ½ inch tubular frame for strength and stability. A fold-down door protects the electronic components from damage.
- Mounting – Each console comes standard with 6-Inch steel swivel casters with brakes on the front two wheels. The casters can be replaced with skid plates that are mounted to the bottom of the machine.
- Output Control – The Start/Stop switch on the 6-Way consoles controls the output voltage of the machine to prevent unintentional power being sent to the heaters on the work piece.

Part Number	Description
09022100	6-Way, XTX (includes manual & programmable control and recorder)
09009902	6-Way, Manual Control
09010102	6-Way, Manual Control with 12-Point Recorder
09009904	6-Way, Programmable Control
09010104	6-Way, Programmable Control with 12-Point Recorder

Twin Heat Module

Description

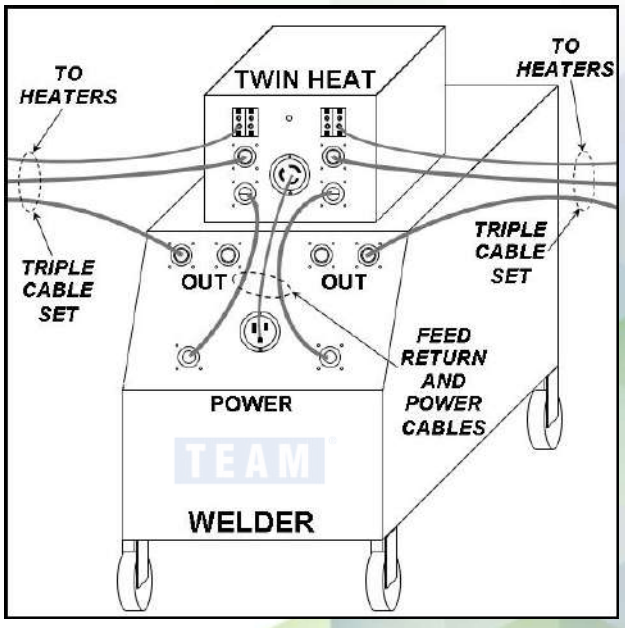
The Twin Heat Module (THM) uses the output of any AC or DC welding machine or transformer to provide up to two independent channels of temperature control for heat treatment. This power is typically supplied by a 65 or 85VAC power source with a 300-amp per zone capacity.

The THM includes temperature controllers, contactor control switches and thermocouple output sockets to facilitate temperature recording. The THM also has the option of a 2-pen temperature recorder. A 16-gauge stainless steel case protects unit components during field operation.

09002900

On-Site Heat Treatment Is Convenient With The THM

The small size makes the THM suitable for use in confined spaces. Portability allows the unit to be moved quickly to widely separate locations on a job site.



Specifications Without Recorder (With Recorder)

Mechanical

Weight	27 lbs. (36 lbs.)
Depth	16 ¾ inches (19 inches)
Width	10 ⅜ inches (11 ¼ inches)
Height	11 ¾ inches (12 inches)

Electrical

Power Circuit to Heaters	
Input/Output Voltage	6-60VDC up to 220VAC
Input/Output Current	300-Amp
Control Circuit, Input	
Voltage	120VAC, 50-60 Hz
Control Circuit, Auxiliary Output	
Voltage	120VAC, 50-60 Hz
Current	25-Amp
(control circuit protected	at 5-Amp breaker)
Temperature Controller	
Temperature Range	0-2400°F
Thermocouple	Type K

Part Number	Description
09002800	Twin Heat Module, Manual Control
09002900	Twin Heat Module, Programmable Control
09007800	Twin Heat Module, Manual Control with 2-Pen Recorder
09007900	Twin Heat Module, Programmable Control with 2-Pen Recorder

The following accessories are necessary to connect to a power source:

or	29001000	Feed/Return Cable with Lug and 300-Amp Connector, 10-foot
	29001002	Feed/Return Cable with 300-Amp Connectors, 10-foot
	29002004	Power Cable, 110VAC, 10-foot (other sizes available)

Description

Individual zone-controlled 6-ways and Twin Heat Modules are controlled by a Universal Digital Controller (UDC). The UDC-2500 model provides basic manual control using the arrow keys to increase or decrease the rate. The programmable UDC-3500 module has setpoint programming (SPP) capabilities that allow up to five programmed segments. The unique feature of the available TISI UDC-3500 model is that it has a special firmware program which simplifies the programming process. Both models are easy to program, operate and read. All configurations and alignments are completed prior to shipment so that upon receipt, the controller can be placed immediately into service.

- Convenient to configure – The operator can increase or decrease the local setpoint, select local or remote operating mode or momentarily display information about the current process with simple keystrokes.
- A bright, dedicated display performs two functions. The upper display is dedicated to the process variable during normal operation. Straightforward prompts allow easy adjustments to the setpoint, process variable, deviations and output values with minimum time and effort, which are shown on the lower display. Status indicators display degrees Fahrenheit, remote or local operation as well as alarm and output conditions.
- The vacuum fluorescent display clearly presents data. Unlike and LED screen, the vacuum fluorescent display is easily readable in direct sunlight.
- The well-designed keyboard encourages quick and accurate data entry.
- Universal inputs are accepted: Nine thermocouple types, RTDs, mA, mV and voltage inputs can be configured simply.

Safety Features To Protect Operating Information

Thermocouple failsafe ensures the integrity of data-configurable upscale or downscale burnout or failsafe output level. The controller reliable performance is immune to high noises. The unit provides reliable, error-free control in industrial environments that often disturb highly noise-sensitive digital equipment. Input signal smoothing is supplied by the configurable digital filter in 0 to 120 seconds. Data integrity is ensured during power losses as non-volatile memory secures the information. Keyboard security prevents accidental or unauthorized changes to process configuration.

Specifications

Accuracy	±1 digital for display
Temperature Stability	±0.01% for full span/°C change typical
Input Signal Failure Protection	Upscale, downscale, or failsafe burnout
Input Impedance	200K ohms
Controller Output Types	Electromechanical or solid state relays, Current out
Available Options	Alarm outputs, RS422/482 or Ethernet TCP/IP communications interface, Infrared communications (standard on UDC-3500)
Sample Rate	Input sampled 6 times/second
Input filter	Off to 120 seconds
Wiring Connections	Screw terminals on rear of case
Power Consumption	20VA (UDC-2500) / 24VA (UDC-3500) maximum (90 to 264VAC)
Weight	3 lbs.

58012900

Part Number	Description
58012200	UDC-2500, Manual (replacement in 09009902, 09010102, 09002800 & 09007800)
58012900	UDC-3500, Programmable (replacement in 09009904, 09010104, 09002900 & 09007900)

XTR Data Logger

The XTR Data Logger is the latest advancement in digital temperature data collection. It features a 12-inch touchscreen for operation and includes twenty-four type K thermocouple inputs for logging temperature data as well as networking capabilities. It is powered by standard 120-volt power and includes our TeamScada View software for viewing and printing charts. The XTR operator software is setup for use in both English and Spanish.

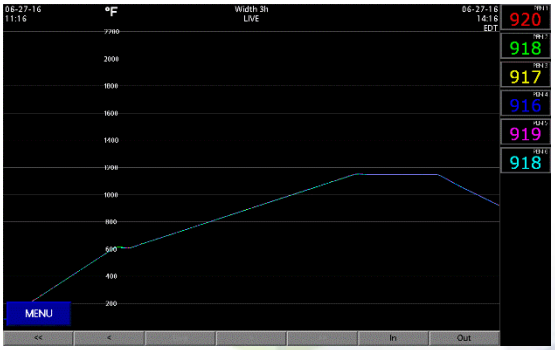
Operator Interface

The XTR can be controlled from the local touchscreen or remotely via a password-protected web page on a networked computer. There are color-coded indicators across all user screens to facilitate identifications and statuses. The XTR's intuitive interface has been designed to reduce training time and operator error. User-designated job information is used to preserve the security of the temperature data.

Viewing Charts

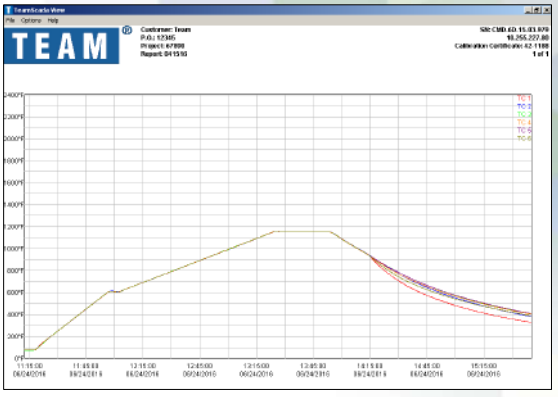
Log files are downloaded to a USB flash drive or directly to a networked computer (using the TeamScada Downloader) to be viewed using the included TeamScada View software. Simply select the specific job information by date and then customize the view of the chart as needed. A completed chart can be printed or emailed as well as saved for historical backup information for a project.

45018000
(shown in optional protective carrying case)



Trend Chart Screen View on XTR

Values Only Screen View on XTR



View of Chart using TeamScada View Software

Specifications

Weight	30 lbs. (without carrying case)
Depth	14 ¾ inches
Width	15 ½ inches
Height	14 inches (with handle up)
Case	304 Stainless Steel, 16-Gauge

Part Number	Description
45018000	Recorder, Digital, XTR
45019000	Carrying Case for XTR

Recorders

Although Team Industrial Services, Inc. recommends the XTR Data Logger as the optimal choice for temperature data recording, other historically traditional options are available in both paper and paperless formats.

Strip Chart Recorder

The strip chart paper recorder is a multi-point recorder whose field worthiness and variable configuration makes is ideally suited for on-site applications. The standard temperature recorder is powered by 120-Volts and available with twelve channels for reliable, accurate records of time-temperature profiles for all control and monitor thermocouples. The 12-Channel model of recorder is also available with twenty-four channels (µR-20,000) or in a smaller 2-Pen or 6-Channel model (µR-10,000).

Operator Interface

Although it can accommodate a wide range of DC-voltage inputs, each channel is factory-configured for type K thermocouples. Printing formats are configurable by means of a convenient menu-driven Setting mode. Chart speed can be programmed from 0.04 to 480-inch/hour; it is factory default set for 2-inch/hour (1-inch/hour for smaller model). In addition to chart paper, the strip chart recorder utilizes a large, easy-to-read full dot matrix display for highly visible read selection and ease of use. Operator input to the recorder is by means of a seven-button keypad to access and navigate the interactive Operation and Setting modes.

µR-20,000 (µR-10,000) Specifications

Weight	19 lbs. (4.85 lbs.)
Depth	8 ⅝ inches (9 ¾ inches)
Width	11 ⅜ inches (5 ⅔ inches)
Height	11 ⅜ inches (5 ⅔ inches)
Case	Drawn Steel, 16-Gauge

Carrying Case

A recorder is traditionally built into a 6-way machine but is also available as a stand-alone unit that can be installed into a carrying case. The recorder will be 'socketed' which means that an enclosure will be mounted to the back of the recorder and wired with the thermocouple jack panel and a power cord. The digital recorders also include an Ethernet port. It can be plugged into any 110-Volt power source and, with the use of a male-to-male thermocouple jumper cable, will be able to record time-temperature profiles. The carrying case is steel-reinforced with a carrying handle and lined with polyurethane foam to protect the recorder during transit and on-site use. The case has removable front and rear doors for easy access.

Digital Paperless Recorder

The GR model is another paperless recorder option that is powered by 120-Volts and available in a 12.1-inch or 5.7-inch color active matrix LCD touchscreen display for clear viewing. Models are available in up to forty-eight analog or sixteen inputs respectively. All collected time-temperature data can be saved to an SD card, USB storage device reader or linked directly through the internet or LAN via an Ethernet connection. The recorder include the basic Trend Viewer software necessary to view the chart on a computer. Additional firmware credits are available for purchase to unlock more features if necessary as are upgraded versions of the viewing software.

Operator Interface

Although it can accommodate a wide range of DC-voltage inputs, each channel is factory-configured for type K thermocouples. The enclosed stylus allows for easy interaction with the touchscreen menus. Using the menus, each pen can be assigned as well as alarms and chart speeds set along with many other features. The gathered data can be analyzed by a variety of graphs either on the LCD display or on a computer. Other software options are available for use with a computer that include additional options if required.

GR Specifications

Weight	22 lbs. (5.3 lbs.)
Depth	8 ⅝ inches (9 ¾ inches)
Width	11 ⅜ inches (5 ⅔ inches)
Height	11 ⅜ inches (5 ⅔ inches)
Case	Mild Steel, Zinc-Plated

45007422 in carrying case

Recorders

Part Number	Model	Type	Inputs	Features
45018000	XTR	Paperless	24	Uses TeamScada View Software
45019000	XTR	N/A	N/A	Carrying Case for XTR
45007321	µR-20,000	Paper	12	Straight out of the box, No Add-ons
45007322	µR-20,000	Paper	24	Straight out of the box, No Add-ons
45007521	µR-20,000	Paper	12	Straight out of the box, Calibrated
45007522	µR-20,000	Paper	24	Straight out of the box, Calibrated
45007421	µR-20,000	Paper	12	Socketed, Calibrated
45007422	µR-20,000	Paper	24	Socketed, Calibrated
45007380	GR	Paperless	12	Straight out of the box, No Add-ons
45007390	GR	Paperless	24	Straight out of the box, No Add-ons
45007580	GR	Paperless	12	Straight out of the box, Calibrated
45007590	GR	Paperless	24	Straight out of the box, Calibrated
45007480	GR	Paperless	12	Socketed, Calibrated
45007490	GR	Paperless	24	Socketed, Calibrated
45001800	µR-20,000 & GR	N/A	N/A	Carrying Case for above model sizes
45007310	µR-10,000	Paper	6	Straight out of the box, No Add-ons
45007312	µR-10,000	Paper	2	Straight out of the box, No Add-ons
45007510	µR-10,000	Paper	6	Straight out of the box, Calibrated
45007512	µR-10,000	Paper	2	Straight out of the box, No Add-ons
45007410	µR-10,000	Paper	6	Socketed, Calibrated
45007412	µR-10,000	Paper	2	Socketed, Calibrated
45007370	GR	Paperless	6	Straight out of the box, No Add-ons
45007570	GR	Paperless	6	Straight out of the box, Calibrated
45007470	GR	Paperless	6	Socketed, Calibrated
45001900	µR-10,000 & GR	N/A	N/A	Carrying Case for above model sizes

RECORDER REPLACEMENT PARTS

Part Number	Model	Type	Description
45020502	µR-1000 & µR-10,000	Chart Paper	0-2000° Scale
45020501	µR-1000 & µR-10,000	Chart Paper	0-100% Scale
45000302	µR-180, µR-1800 & µR-20,000	Chart Paper	0-2000° Scale
45000301	µR-180, µR-1800 & µR-20,000	Chart Paper	0-100% Scale
45033100	DPR-100	Chart Paper	0-100% Scale
45030900	DPR-180	Chart Paper	0-100% Scale
45031000	DPR-3000 & DPR-250	Chart Paper	0-100% Scale
45011900	AL-3000	Chart Paper	0-100% Scale
45009800	AH-3000	Chart Paper	0-2000° Scale
45009801	AH-3000	Chart Paper	0-100% Scale

45009800

45004000

Part Number	Model	Type	Description
45020100	µR-1000 & µR-10,000	Chart Ribbon	Ribbon Cartridge, 6-Color
45020200	µR-1000 & µR-10,000	Chart Pen	Pen, Red
45020300	µR-1000 & µR-10,000	Chart Pen	Pen, Green
45020400	µR-1000 & µR-10,000	Chart Pen	Pen, Purple (Plotter)
45004000	µR-180, µR-1800 & µR-20,000	Chart Ribbon	Ribbon Cartridge, 6-Color
45033200	DPR-100	Chart Pen	Pen, Red
45033300	DPR-100	Chart Pen	Pen, Blue
45030800	DPR-180, DPR-3000 & DPR-250	Chart Ribbon	Ribbon Cartridge, 6-Color
45012000	AL-3000	Chart Ribbon	Ribbon Cartridge, 6-Color
45013000	AH-3000	Chart Ribbon	Ribbon Cartridge, 6-Color

CONTACTORS

Part Number	Description
Primary Contactor (controls output power)	
59004901	Contactor, 3-Pole (replaces 59004900 and 59005000)
Secondary (Zone) Contactors	
59001300	Contactor, 1-Pole
59001400*	Repair Kit for 59001300
59003601	Contactor, 1-Pole (no repair kit available)

*Each repair kit includes:
- 1 – Upper Contact Assembly
- 2 – Lower Contact Assembly
- 1 – Replacement Spring

CIRCUIT BREAKERS

Part Number	Description
57003704	Circuit Breaker, 1-Pole, 5-Amp, Rocker
57004102	Circuit Breaker, 3-Pole, 125-Amp
57004301	Circuit Breaker, Panel Mount, 5-Amp
57004302	Circuit Breaker, Panel Mount, 10-Amp
57004305**	Circuit Breaker, Panel Mount, ¾-Amp

**Replaces fuse holder 57001700 with ¾-Amp fuse 57001101

FUSES & FUSE HOLDERS

Part Number	Description
57001101	Fuse, AGC, ¾-Amp (contactor protection)
57001104	Fuse, AGC, 2-Amp (cooling fan protection)
57001305	Fuse, KTK-R, 5-Amp
57001310	Fuse, KTK-R, 10-Amp
57001700	Fuse Holder for 57001101
57004400	Fuse Holder for 57001104
57000102	Fuse Holder for 57001305 and 57001310

INDICATOR LIGHTS

Part Number	Description
50000300	Indicator, Red, 80VAC LED with Leads
50000303	Indicator, Green, 125VAC LED with Leads

RELAYS

Part Number	Description
59001500	Relay Base, 8-Pin
59001700	Relay, 120VAC, 8-Pin, Illuminated

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SWITCHES

Part Number	Description
62007700***	Switch Assembly, Start/Stop (Oval)
62003801	Switch, Pushbutton (for Ammeter 71001800)
62010400	Switch, Rotary (for Ammeter 71002001)
62010100	Knob for 62010400
62008501	Switch Assembly for THM, Zone 1
62008502	Switch Assembly for THM, Zone 2

***If replacing square-style Start/Stop switch, requires adapter plate, part number 09020600

PANEL METERS

Part Number	Description
71001800	Ammeter, 0-300 Amps, Panel Mount
71002000	Discontinued – see part number 71002001
71002000T	Screw Terminal Adapter for 71002000
71002001*	Ammeter, 0-150 Amps, Panel Mount

*Adapter plate required if replacing 71002000

TRANSFORMERS

Part Number	Description
Primary (Main) Transformer	
60000710	Transformer, 60kVA Input Voltages: 380/415/440/480/575VAC Output Voltages: 65/85VAC
Secondary (120V Step-Down) Transformer	
60001100	Transformer, 750VA Input Voltages: 208-600VAC Output Voltages: 120-240VAC
Current Transformer (CT)	
60003901	Current Transformer for Ammeter 71001800
60003902	Current Transformer for Ammeter 71002001

ELECTRICAL CONNECTIONS

Part Number	Description
56013400	Edison Plug, Panel Mount for 120VAC Bypass
57000601	GFI Receptacle, Duplex Edison
57000602	Cover for GFI Receptacle
56012112	Terminal Block, Double Row, 12-Term
57004603	Power Distribution Block for Input Power
56010400	Ground Lug, Copper
56010304	Crimp Lug, ⅜-inch hole, Purple
56011605	Crimp Lug, ⅜-inch hole, Green
56011610	Crimp Lug, ½-inch hole, Green

Crimp lugs are for internal cable assemblies. Individual cable assemblies are also available.

FANS & FILTERS

Part Number	Description
72000101	Cooling Fan, Axial, 10-inch
72000201	Cord for Cooling Fan 72000101
72000400	Exhaust Fan, Wire Frame, 12-inch
52005901	Filter, 20 x 20 x 1
52005902	Filter, 20 x 10 x 1
52005904	Filter, 7 ⅜ x 16 ½ x ½ (XTX Filter Panel)

HARDWARE

Part Number	Description
09002400	Latch, Lever for Rear Machine Door
54009600	Latch, T-Handle for Rear Machine Door
54009700	Handle, 5-inch for XTX Filter Panel
54012200	Handle for Front Door Pocket
54012300	Magnet for Front Door Catch
54008300	Handle for Front of THM and XTR
54008900	Handle, Fold Down for Top of THM and XTR
09002500	Feet, Rubber for THM and XTR

STRAIN RELIEF GRIPS

Part Number	Description
56006701	Strain Relief Grip, Oval, ½-inch
56006704	Strain Relief Grip, Oval, 1 ¼-inch
56006705	Strain Relief Grip, Oval, 1 ½-inch
56006707	Strain Relief Grip, Oval, 2-inch
64004201	Strain Relief Grip, Mesh, 1-inch
64004202	Strain Relief Grip, Mesh, 1 ¼-inch

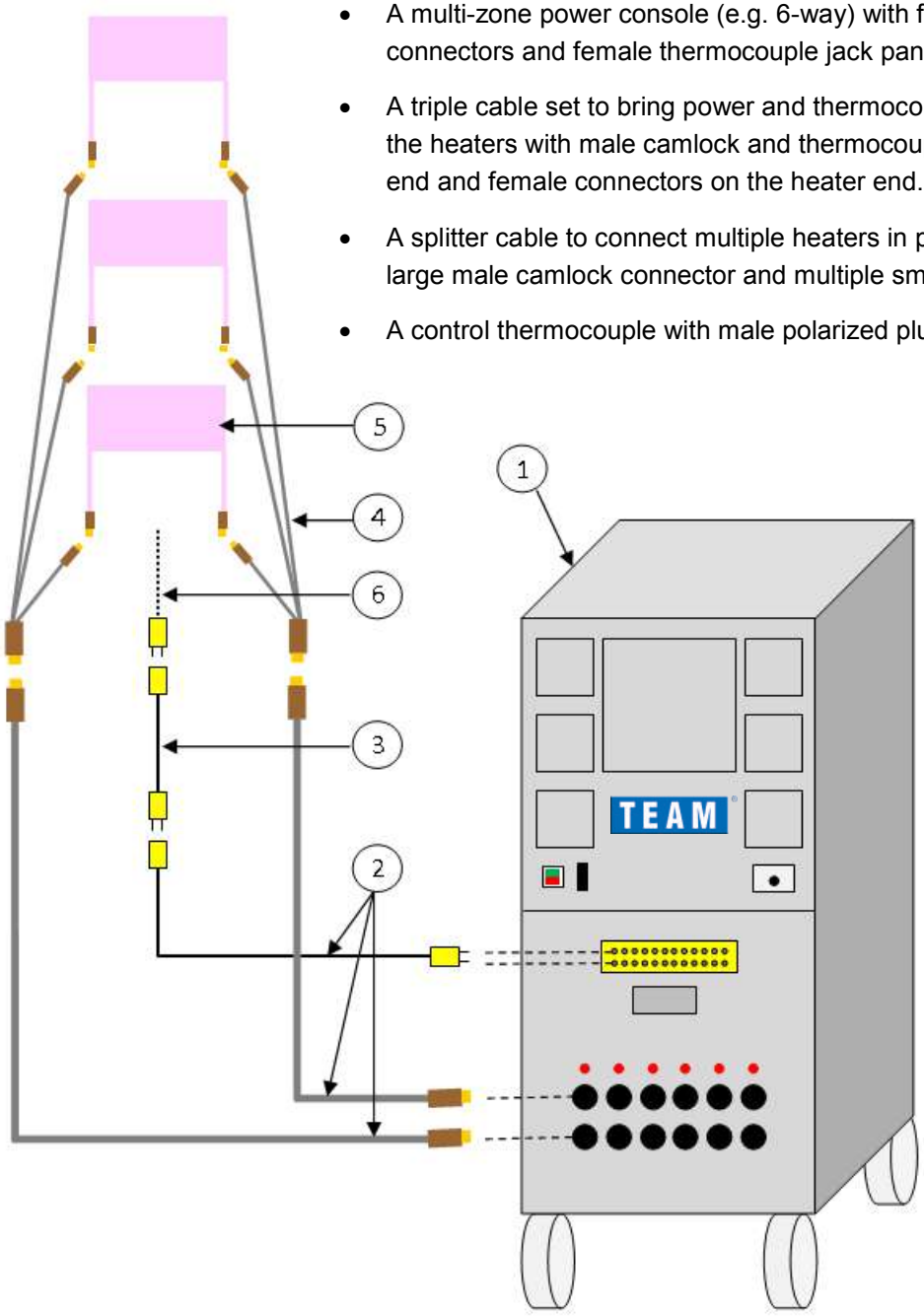
CASTERS

Part Number	Description
54000403	Swivel Caster without Brake, 4-inch
54000404	Swivel Caster with Brake, 4-inch
54000413	Swivel Caster without Brake, 6-inch
54000414	Swivel Caster with Brake, 6-inch

To ensure proper air flow, only use fiberglass filters.
Do not use HEPA filters or any other corrugated style filters.

A typical electric resistance heat treating circuit consists of the following components:

- A multi-zone power console (e.g. 6-way) with female camlock electrical power connectors and female thermocouple jack panels. *Item 1*
- A triple cable set to bring power and thermocouple cabling from the power source to the heaters with male camlock and thermocouple connectors on the power console end and female connectors on the heater end. *Item 2*
- A splitter cable to connect multiple heaters in parallel in the same zone circuit with one large male camlock connector and multiple small female camlock connectors. *Item 4*
- A control thermocouple with male polarized plug connector. *Item 6*



Triple Cable Set

A triple cable consists of a taped assembly of twin power cables and a thermocouple extension cable. The multi-stranded power cables are flexible and covered with a thermoplastic rubber insulation that is resistant to abrasion, oil, acid, ultraviolet light and high temperature. The type K thermocouple extension cable is solid 20-AWG PVC-sheathed shielded wire that is encased in a PVC abrasion-resistant jacket and equipped with polarized male and female thermocouple connectors.

Power Cabling

Specifications

Assembly

Length	25-foot, 50-foot or 100-foot standard
Weight	51 lbs. / 100-foot
Binding	Fiberglass tape, 1-foot pitch

Power Cable

Size	#2, approximately ½-inch outer diameter
Stranding	Seven bundles of 90 strands of 30-gauge
Insulation	Ultra-Flex thermoplastic rubber
Ratings	-74°F to 221°F, 600-Volt, 300-Amp camlocks

Thermocouple Extension Cable

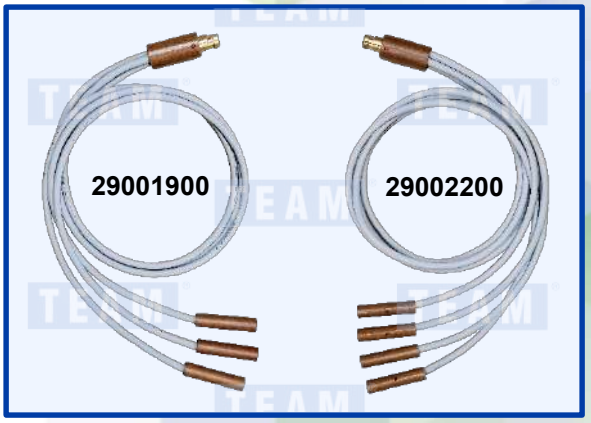
Type	K, Chromel-Alumel
Size	20-AWG, Solid
Insulation	PVC with PVC outer jacket
Connectors	Polarized male and female connectors

Splitter Cable

Three-way splitters are standard to enable three heaters to be connected in parallel to a single control zone. Two splitter cables are needed for each zone. Each splitter cable connects one of the two power cables of a triple cable set to one side of the three parallel heaters. Two-way and four-way splitters are also available.

Specifications

Length	4-foot long
Weight	2 lbs. / 3-way
Size	#6, approximately ⅜-inch outer diameter
Stranding	Seven bundles of 37 strands of 30-gauge
Insulation	Ultra-Flex thermoplastic rubber
Ratings	-74°F to 221°F, 600-Volt, 300-Amp male and 150-Amp female camlocks



Part Number	Description
29004001	Triple Cable Set, 25-foot long
29004002	Triple Cable Set, 50-foot long
29004003	Triple Cable Set, 100-foot long
29001500	Splitter, 2-way, 4-foot long
29001900	Splitter, 3-way, 4-foot long
29002200	Splitter, 4-way, 4-foot long
55002700	Power Cable, 4/4*

*Order in 25-foot increments

Additional cable is available in 10-foot increments:

Part Number	Description
55002401	#6 Cable, Gray for Splitters
55002601	#2 Cable, Gray for Triple Cables
49000200	Thermocouple Extension Cable

Camlock Connectors

Camlock electrical power connectors achieve an insulated locking connection with an approximate ½-turn for high-amperage circuits. Connector sets are available in panel mount and in-line styles.

Specifications

Large In-Line — Brass male/female body, 300-Amp
Fiber electrical insulating sleeve
Fiber interlocking pin

Small In-Line — Brass male/female body, 150-Amp
Fiber electrical insulating sleeve
Fiber interlocking pin

Panel Mount — Brass male/female body, 150- or 300-Amp
Bolted neoprene casing or high-impact plastic

Female In-Line Connectors without Sleeve

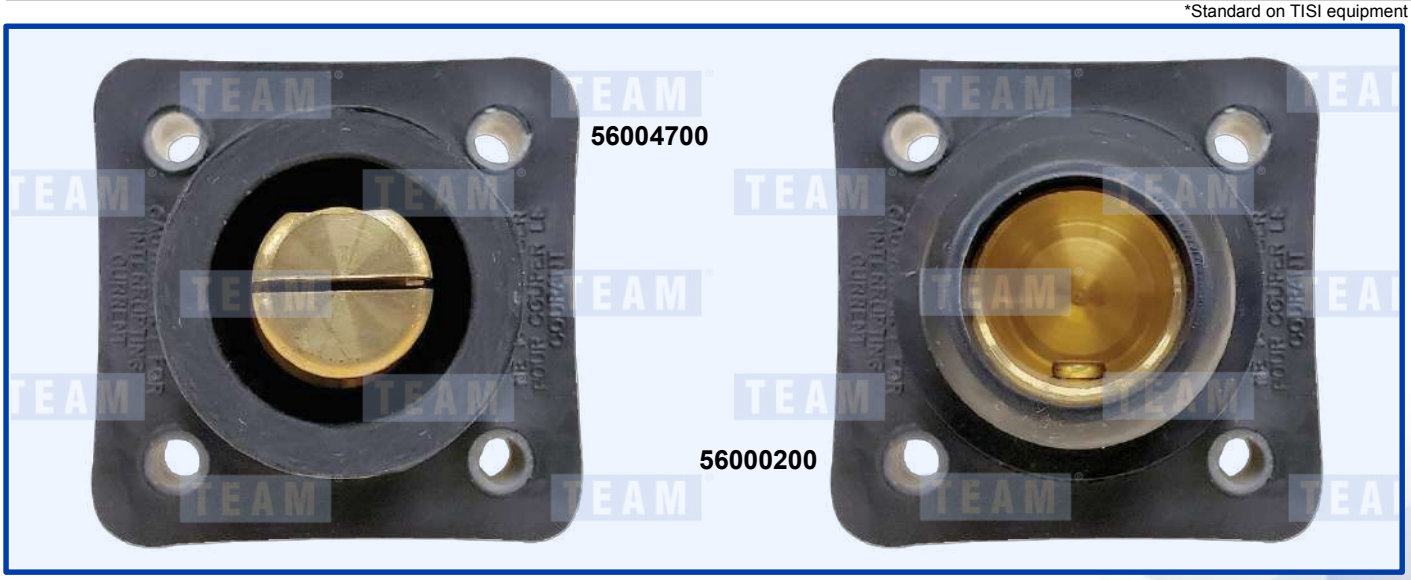
Style	Insulator	Rating	Gender	Description	Part Number
In-Line	Fiber	300-Amp	Male	Complete (Brass, Sleeve, Pin)	56000400
In-Line	Fiber	300-Amp	Male	Sleeve Only	56001400
In-Line	Fiber	300-Amp	Female	Complete (Brass, Sleeve, Pin)	56000500
In-Line	Fiber	300-Amp	Female	Sleeve Only	56001600
In-Line	Fiber	300-Amp	N/A	Pin Only	56001700

Style	Insulator	Rating	Gender	Description	Part Number
In-Line	Fiber	150-Amp	Male	Complete (Brass, Sleeve, Pin)	56000600
In-Line	Fiber	150-Amp	Male	Sleeve Only	56002000
In-Line	Fiber	150-Amp	Female	Complete (Brass, Sleeve, Pin)	56000700
In-Line	Fiber	150-Amp	Female	Sleeve Only	56002200
In-Line	Fiber	150-Amp	N/A	Pin Only	56002300

Camlock Connectors

Style	Insulator	Rating	Gender	Description	Part Number
Panel Mount	Neoprene	300-Amp	Male	Complete, ½-inch stud	56004700
Panel Mount	Neoprene	300-Amp	Female	Complete, ½-inch stud	56000200*
Panel Mount	Neoprene	150-Amp	Male	Complete, 5⁄16-inch stud	56004500
Panel Mount	Neoprene	150-Amp	Female	Complete, 5⁄16-inch stud	56004200

*Standard on TISI equipment



Style	Insulator	Rating	Gender	Description	Part Number
Panel Mount	High-Impact Plastic	300-Amp	Male	Complete, ⅜-inch stud	56004800
Panel Mount	High-Impact Plastic	300-Amp	Female	Complete, ⅜-inch stud	56005300
Panel Mount	High-Impact Plastic	150-Amp	Male	Complete, ¼-inch stud	56004600
Panel Mount	High-Impact Plastic	150-Amp	Female	Complete, ¼-inch stud	56004300

Thermocouple

Description

To measure the surface temperature of a metallic work piece, do no rely on contact heat transfer from your work piece surface to the separate junction of a sheathed or twisted-wire thermocouple. Instead get the most reliably accurate temperature measurement by turning the work piece into a thermocouple junction with the use of a capacitance discharge thermocouple welder (thermocouple attachment unit, TAU).

Operation

The TAU provides major improvements over other methods for attaching thermocouples to both ferrous and non-ferrous metals. It attaches the necessary thermocouples directly to the work piece for stress relieving carbon and low alloy steels. The portable, rugged TAU can reach any job easily. The unit attaches thermocouples quickly so that heat treating can be done promptly and the work piece returned to use.

Cost Savings

Expensive errors occur when thermocouples are not directly attached to the work piece and do not accurately measure the heat treating temperatures. The TAU eliminates these errors and minimizes downtime. The penetration depth is minimal: 0.007 inches (0.18 mm) and 0.003 inches (0.07 mm) in the heat-affected zone. Marring is easily removed by light filing. The TAU will alert the operator with a visual and audible indicator when the unit has cycled and reached the set power level. The unit's discharge can be set for Manual or Auto mode which is especially useful when attaching several wires in succession.

Specifications

Weight	12.3 lbs.
Height	8.13 inches
Length	12.8 inches
Depth	3.48 inches
Battery Type	12-Volt Nickel Cadmium (NiCad)
Voltage	120VAC, 60 Hz
Thermocouple	E, J, K, T
Wire Capability	14 – 20 Gauge (AWG)
Voltage Discharge	25 – 75 VDC
Energy Discharge	1 – 48 Joules

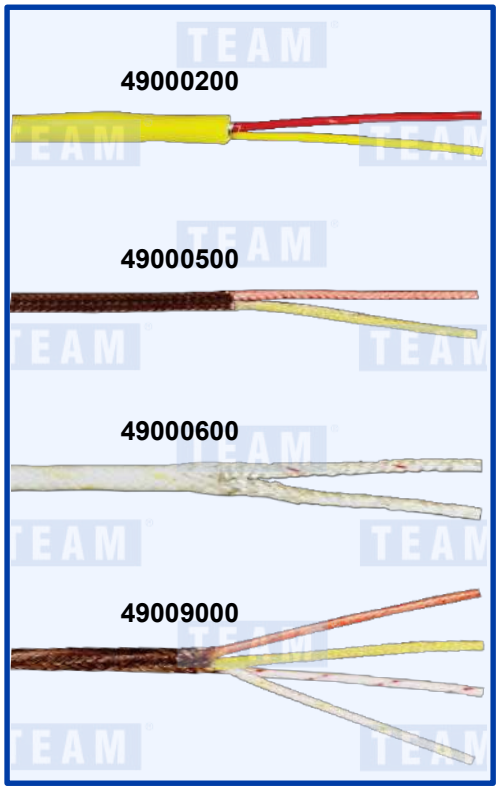
Replacement parts for Thermocouple Attachment Unit:

Part Number	Description
13010100	Thermocouple Attachment Unit, ACE-19
13001000	Plier Assembly with Male Camlock
13005300	Adjustable Shoulder Strap
54004500	Magnet
56000700	Female Camlock to connect pliers
63002200	Battery for Series IV or ACE-19 TAU
63002800	Battery for 41756 TAU
63012300	Power Cord for Series IV or ACE-19 TAU
63012400	Power Cord for 41756 TAU

Thermocouple

A typical thermocouple circuit consists of the following components:

- A thermocouple containing the hot junction on the work piece surface.
  It can be either a sheathed, twisted-wire or capacitance discharge-welded thermocouple.
- A male polarized plug attached to the connection end of the thermocouple.
  Its large diameter prong and small diameter prong avoid cross-connecting +/- leads.
- A thermocouple extension cable connecting the thermocouple to the recorder.
  It has a female socket on the thermocouple end and a male plug on the recorder end.
- A recorder or similar measuring instrument to indicate and/or document the temperature value.
  A polarized female jack panel is needed to accept the thermocouple extension cable.



There are a variety of types of thermocouple wire with different metallic combinations; however, type K, Chromel-Alumel wire, with a temperature range of 32°F to 2300°F, is best suited for most of the thermal processes conducted in heat treating. The Chromel element is the non-magnetic positive lead with yellow insulation. The Alumel element is the magnetic negative lead with red insulation.

In addition, there is a variety of individual wire insulation and overall jacket materials. Q/Q (braided quartz glass insulation and jacket) is an excellent choice for most applications because of it abrasion and temperature resistance. Cefir (braided ceramic fiber insulation and jacket) is appropriate for extreme temperature applications.

Most thermocouple wire only contain a single pair of conductors: one positive and one negative. However, TEAM also supplies a double conductor pair Q/Q thermocouple wire which contains two positive and two negative conductors for a total of four wires. The positive leads are easily denoted by the solid yellow and striped yellow jackets whereas the negative leads are identified by the solid red and striped red jackets. The double conductor Q/Q wire can help save time and money by eliminating the need to tape a second wire as a spare or for a secondary temperature reading.

Specifications

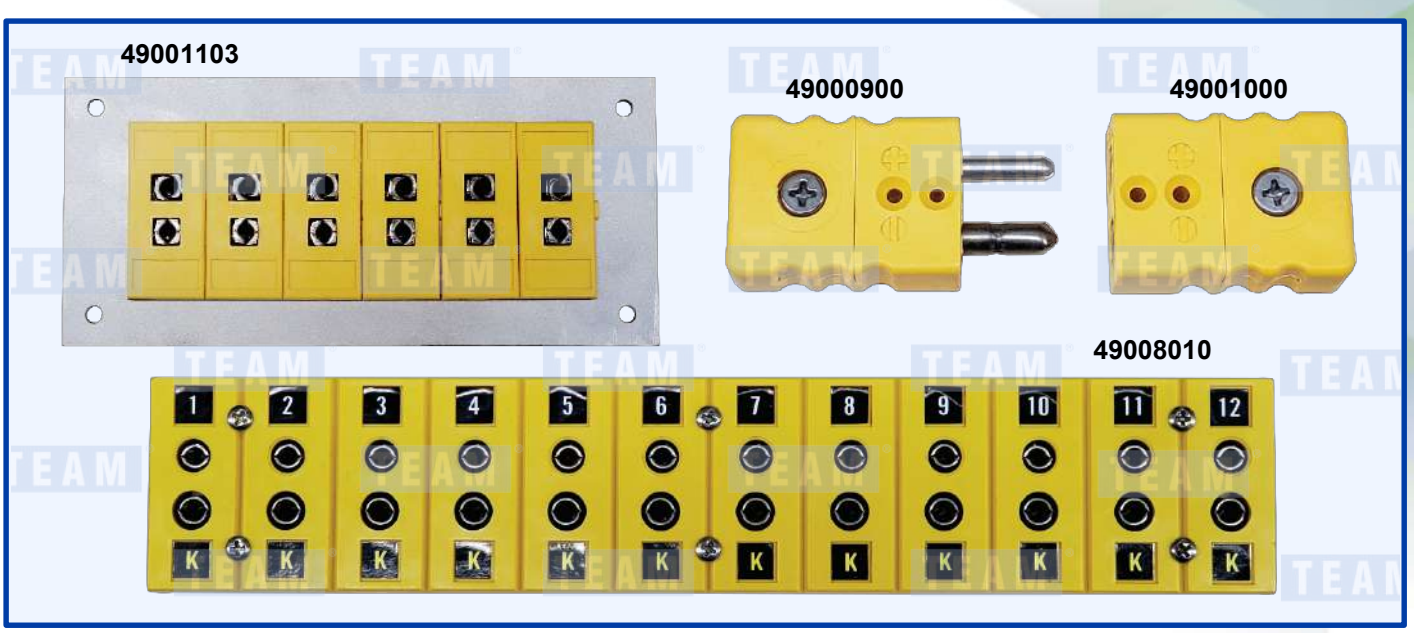
Type	K (Chromel-Alumel)
Wire	20-Gauge (AWG)
Maximum Range	
Extension	221°F continuous
Q/Q	1200°F continuous (1600°F, single)
Cefir	2200°F continuous (2400°F, single)
Quality	Certificate of Conformance

Part Number	Description
49000200	Wire, K TC, Extension with PVC shielded jacket
49000500	Wire, K TC, Q/Q
49000600	Wire, K TC, Cefir
49009000	Wire, K TC, Q/Q, Double Conductor

Thermocouple

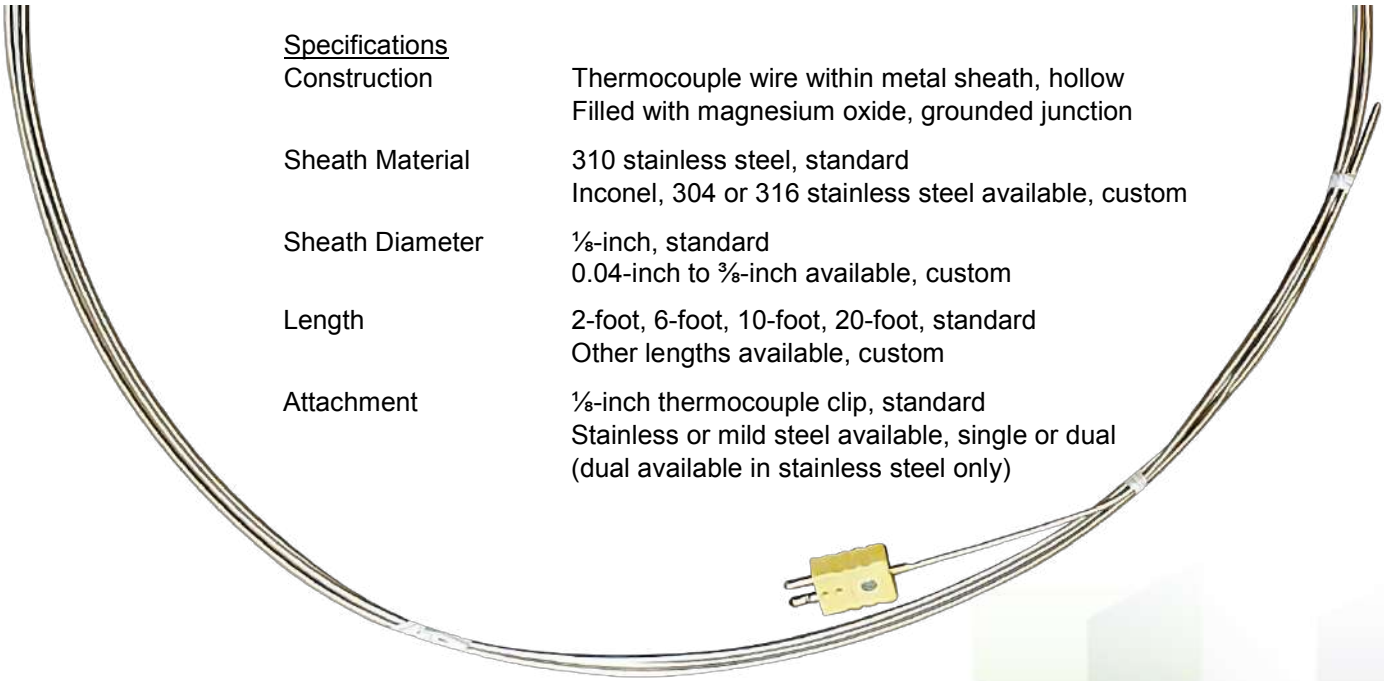
TISI has a variety of thermocouple extension wires and cables available as well as connectors and jack panels. The extension wire has a PVC wire insulation and shielded jacket. All standard parts are type K, 20-gauge (AWG) but other types and sizes are available. Contact your TISI sales representative for more information.

Part Number	Description
49004003	TC Cable Assembly, K TC Extension with Male and Female Connectors, 25-foot
49004004	TC Cable Assembly, K TC Extension with Male and Female Connectors, 50-foot
49004005	TC Cable Assembly, K TC Extension with Male and Female Connectors, 100-foot
49004203	TC Cable Assembly, Jumper, K TC Extension with Male Connectors, 6-foot
49004202	TC Cable Assembly, Jumper, K TC Extension with Male Connectors, 10-foot
49004100	TC Cable Assembly, K TC Q/Q with Male Connector, 10-foot
49000900	Plug (Male), TC, Type K
49001000	Socket (Female), TC, Type K
49008100	Plug (Male), TC, Type K, Midget
49008200	Socket (Female), TC, Type K, Midget
49001103	TC Jack Panel, 6-point, Screw Mount
49001105	TC Jack Panel, 12-point, Screw Mount
49001106	TC Jack Panel, 24-point, Screw Mount
49008001	TC Jack Panel, Numbered 1-2, Panel Mount
49008004	TC Jack Panel, Numbered 1-6, Panel Mount
49008005	TC Jack Panel, Numbered, 7-12, Panel Mount
49008010	TC Jack Panel, Numbered 1-12, Panel Mount
49008011	TC Jack Panel, Numbered 13-24, Panel Mount
49008002	TC Jack Panel, Numbered Dual 1, Panel Mount
49008003	TC Jack Panel, Numbered Dual 2, Panel Mount
49008012	TC Jack Panel, Numbered Dual 1-6, Panel Mount



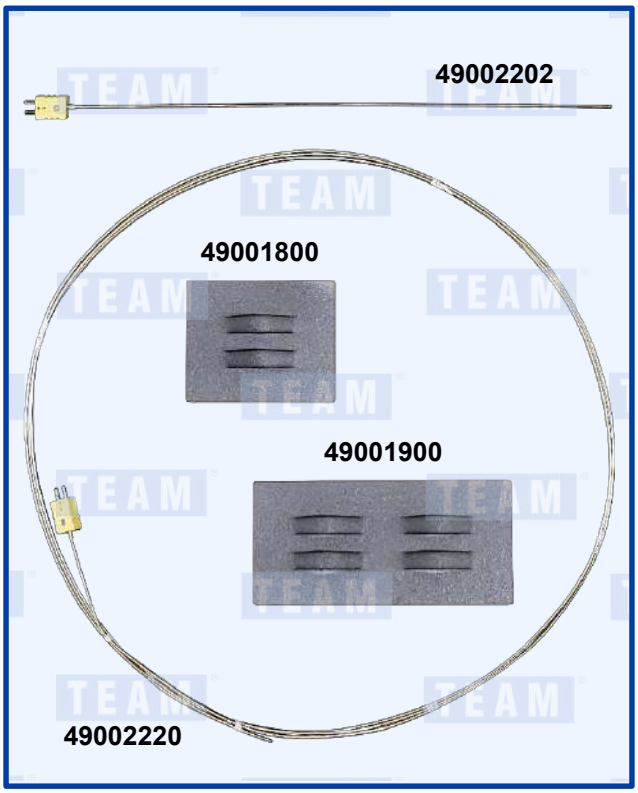
Thermocouple

Unlike thermocouple wire, sheathed thermocouples cannot be capacitance discharge-welded to work piece surfaces. They must be attached to the work surface with clips or banding, both available from TISI. Clips can be welded to the surface or attached with a high temperature moldable putty which is dispensed using a caulking gun. The putty is available in both RCF (refractory ceramic fiber) and non-RCF compositions.



Specifications

Construction	Thermocouple wire within metal sheath, hollow Filled with magnesium oxide, grounded junction
Sheath Material	310 stainless steel, standard Inconel, 304 or 316 stainless steel available, custom
Sheath Diameter	⅛-inch, standard 0.04-inch to ⅜-inch available, custom
Length	2-foot, 6-foot, 10-foot, 20-foot, standard Other lengths available, custom
Attachment	⅛-inch thermocouple clip, standard Stainless or mild steel available, single or dual (dual available in stainless steel only)



Part Number	Description
49002202	TC Sheathed, Type K, ⅛-diameter, 2-foot
49002204	TC Sheathed, Type K, ⅛-diameter, 4-foot
49002206	TC Sheathed, Type K, ⅛-diameter, 6-foot
49002210	TC Sheathed, Type K, ⅛-diameter, 10-foot
49002215	TC Sheathed, Type K, ⅛-diameter, 15-foot
49002220	TC Sheathed, Type K, ⅛-diameter, 20-foot
49002225	TC Sheathed, Type K, ⅛-diameter, 25-foot
49001800	Clip, Single, TC, Stainless Steel
49001900	Clip, Dual, TC, Stainless Steel
49002000	Clip, Single, TC, Mild Steel
37000100	Putty, Moldable, 11 oz. Tube (RCF)
37000101	Putty, Moldable, 11 oz. Tube (non-RCF)

Single TC clip side view

TC clip holding thermocouple

The 940A is a thermocouple simulator which can source or measure four common thermocouples as well as millivolt (mV). Features include high accuracy (±0.3°C for Type K), source resolution of 0.1°F/C as well as MIN, MAX, AVG, RNG and STD DEV in measure mode. Preset values can be set per thermocouple which is easily done utilizing the arrow buttons. Measure and source values can be viewed simultaneously via mini-plug connections to the respective inputs. The calibrator is protected in a durable case that has passed shock, drop and vibration tests as well as boasts a sealed keypad to protect from fluids and dirt. Unit includes built-in tilt stand and magnetic mounts.

Specifications

Mechanical

Weight	12.8 ounces (0.80 lbs.)
Length	7.6 inches
Width	3.3 inches
Depth	1.1 inches
Case	Shock, drop, vibration resistant plastic
Accessories	Protective rubber boot, foam-filled hard cover carrying case (sold separately)

Electrical

Input Source	AA alkaline batteries (3)
Battery Life	500 hours typical, 4-stage battery charge indicator

Calibration

Measure	J, K, T, E thermocouples, mV
Range	-454 to 2501°F (-270 to 1372°C) for Type K
Accuracy	±0.3-0.8°C (based on range), 0.1°F/C resolution
Connection	External mini-plug for measure and source inputs, ±0.15°C cold junction accuracy
Program	Twenty possible preset values

Part Number	Description
65002300	Temperature Calibrator, 940A

According to our company standards, calibration of our equipment is required every six months. Team Industrial Services, Inc. provides calibration services for all applicable equipment. Please contact your sales representative for more information.

The standard Brinell kit include the following in a compact carrying case:

- Large Bar Holder
- Five Random Test Bars
- Scope
- Computing Wheel
- Computation Pad

Part Number	Description
13005001	Brinell Kit with Large Bar Holder
13007600	Fillet Weld Tester (for small spaces)
13006600	Scope
13005105	Brinell Bar, 194 Hardness
	Other size hardness bars available

Construction

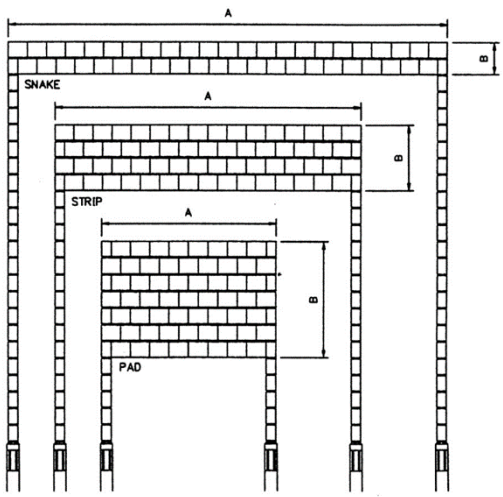
Flexible ceramic pad (FCP) heaters are manufactured by weaving multi-stranded 80/20 Nichrome electric resistance heating wire through passages within interlocking ceramic beads. The beads are molded from sintered 94% Alumina ceramics, more than ⅜-inch thick. The Alumina has excellent high-temperature dielectric properties which combined with the interlocking bead design provide FCP heaters with exceptional electrical insulating qualities.

Flexibility

The interlocking bead design imposes rigidity along the heater length while allowing flexibility along the heater width, enabling it to conform to the curved surfaces of pipes and pressure vessels. A nominal ten-inch length of nickel wire is welded to each end of the Nichrome wire to create a cold tail to prevent the electrically insulated camlock connectors from being heated.

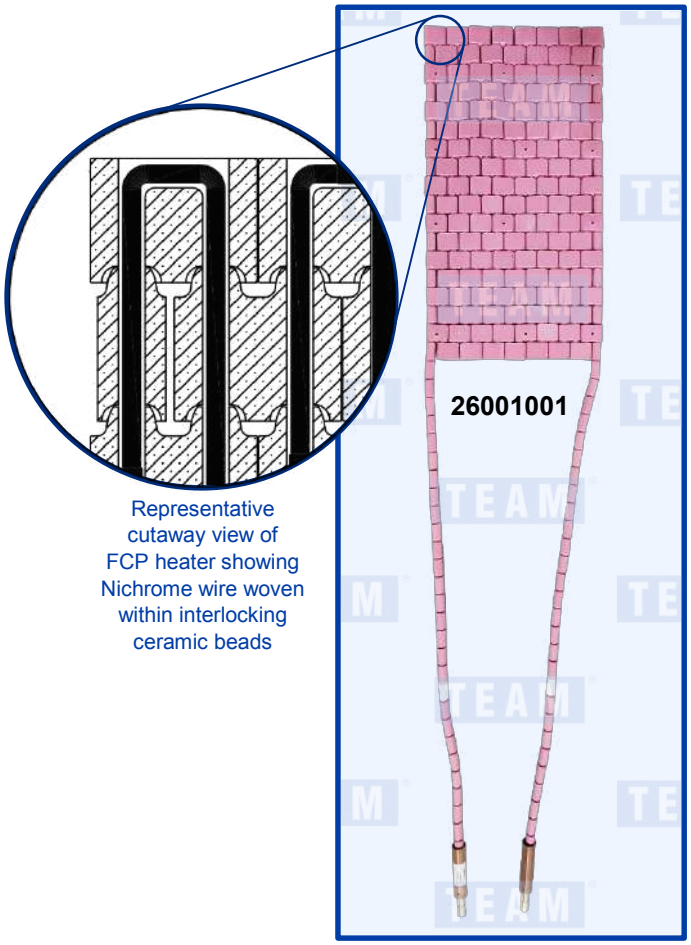
Thermal Power

FCP Heaters are generally available in two standard values: 80VAC, which are the most common, and 60VAC. Custom-designed heaters, however, can also be provided. All 80VAC heaters are rectangular with a surface area of 120 square inches and a thermal power of 3.6 kW, producing a power density of 30 W/in^2 with an electrical current of 45 amps. The 60VAC counterparts are simply three-quarters the size of an 80VAC pad with a surface area of 90 square inches and 2.7 kW thermal power but with the same power density and electric current. All 80VAC heaters can be run on 60VAC, but their kW output is reduced from 3.6 to 2. Their rectangular shapes are available in the varieties of width and length combinations specified in the respective tables.



80VAC HEATERS

Part Number	Type	Width (A) Inches	Height (B) Inches
26000701	CP3	3	39
26000801	CP4	4	29
26000901	CP6	6	19 ½
26001001	CP8	8	14 ½
26001101	CP10	10	12 ½
26001201	CP12	12	9 ¾
26001301	CP15	15	8
26001401	CP18	18	6 ½
26001501	CP21	21	5 ¾
26001601	CP24	24	5
26001701	CP29	29	4
26001801	CP36	36	3 ¼
26001901	CP72	72	1 ¾
26002001	CP120	1	120



Representative cutaway view of FCP heater showing Nichrome wire woven within interlocking ceramic beads

60VAC HEATERS

Part Number	Type	Width (A) Inches	Height (B) Inches
26002101	CP3	3	28 ½
26002201	CP4	4	21
26002301	CP6	6	14 ½
26002401	CP8	8	10
26002501	CP10	10	9
26002601	CP12	12	7 ¼
26002701	CP15	15	5 ¾
26002801	CP18	18	5
26002901	CP21	21	4
26003001	CP26	26	3 ¼
26003101	CP52	52	1 ¾
26003201	CP87	1	87

Features

Because of their design and components, FCP heaters have the following benefits:

- Durability – The ductility of multi-stranded Nichrome wire means a longer heater life
- Uniformity – Evenly woven wire means temperature uniformity throughout the heater
- Ruggedness – Abrasion-resistant ceramic means heaters withstand rough handling

Variations

Due to the availability of different bead configurations and different grades and gauges of electric resistance wires, a variety of custom heater designs can be made available:

- Shapes – Combinations of rectangles, trapezoids and triangles
- Fingers – Non-interlocking designs that can conform to conical work piece surfaces
- Higher Temperature – Special heaters for temperatures up to 2300°F
- Sizes – Smaller heaters that can be connected in series for standard voltages
- Voltages – Different size heaters can be made for non-standard voltages
- Insulated Pads – FCPs can be assembled to custom mesh mats for insulated modules

Custom heaters are available, contact your TISI sales representative for more information.

Heaters

Replacement parts for the FCP Heaters:

Part Number	Description
26010500	60V FCP Heater Repair Kit
26010600	80V FCP Heater Repair Kit
51000100	Body Bead, Standard
51000200	Body Bead, Standard with Hole
51000300	End Bead, Male
51000400	End Bead, Female
51000500	Tail Bead, Pink
51000600	Tail Bead, White
26009602	60V Heater Core Wire Assembly
26009600	80V Heater Core Wire Assembly

Also available:

26009605	20V Heater Core Wire Assembly
26009604	30V Heater Core Wire Assembly
26009603	40V Heater Core Wire Assembly

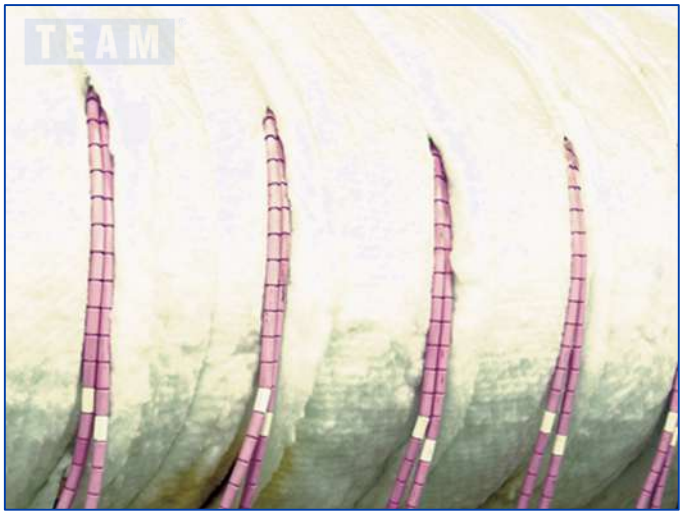
Description	60VAC Kit Quantities	80VAC Kit Quantities
60V Heater Core Wire Assembly	5	-
80V Heater Core Wire Assembly	-	5
Body Bead, Standard	85	125
Body Bead, Standard with Hole	8	10
End Bead, Male	35	50
End Bead, Female	35	50
Tail Bead, Pink	35	50
Tail Bead, White	10	10
Connector, 150-Amp Male Power	10	10

Components

A thermal insulation system has two primary components: the insulation material and the means to secure the insulation to the surfaces of the work piece. Team Industrial Services, Inc. is a source of supply for a variety of products in both component categories.

Insulation Material

Thermal insulation is available in a wide variety of materials and forms. TISI makes available those materials and forms that are best suited for on-site thermal processing because of their cost effectiveness in application and heat loss prevention.



RCF

Refractory ceramic fiber (RCF) blanket is the most widely used insulation for elevated temperature applications and is available in various thicknesses, widths and densities. However, mineral wool delta board is the most cost sensible option for single-use applications.

Non-RCF

Silica blanket is a soluble non-RCF material used for insulation. It is constructed of amorphous silica, whose construction imparts fiber integrity for high temperature reusable applications. Cooperknit is a silica-based knitted textile that offers that advantage over other types of insulation because the fabric does not break down, preventing harmful airborne particles and can be reused without any significant deterioration.

Part Number	Material	RCF	Thickness	Width	Length	Density	Limit
37000900	Ceramic Fiber	Yes	1-inch	2-foot	25-foot	6 lb./ft^3	1800°F
37000800	Ceramic Fiber	Yes	1-inch	2-foot	25-foot	8 lb./ft^3	1800°F
37000700	Mineral Wool*	Yes	2-inch	2-foot	4-foot	8 lb./ft^3	1000°F
37000200	Silica Blanket	No	1-inch	2-foot	25-foot	6 lb./ft^3	2200°F
37012500	Silica Blanket	No	1-inch	2-foot	25-foot	8 lb./ft^3	2200°F
37004500	Welding Cloth	No	Nominal	3-foot	50-yard	18 oz./yd^2	1800°F
37009600	Welding Cloth	No	Nominal	3-foot	50-yard	36 oz./yd^2	1800°F
37009300	Cooperknit	No	½-inch	2-foot	25-foot	15.2 lb./ft^3	2000°F

*Mineral wool is sold in sets of seven pieces for a total of 56 square feet

Insulation

Team Industrial Services, Inc. manufacturers a variety of standard and custom insulation mats in which the insulation material (ceramic fiber or silica blanket) is encased in a stapled or stitched protective outer layer of stainless steel-knitted mesh or high temperature silica welding cloth respectively. Cooperknit is also available as mats but does not require an outer protective layer; the material is cut to size and sewn at both ends.

Product Size	Mesh Mat 6# Ceramic Fiber	Mesh Mat 8# Ceramic Fiber	Mesh Mat 6# Silica Blanket	Mesh Mat 8# Silica Blanket	Insulation Pad Silica	Cooperknit Mat Silica
1 ft. x 2 ft.	37007802	37008002	37012601	37012701	37022002	-
1 ft. x 3 ft.	37007803	37008003	-	-	37022003	-
1 ft. x 4 ft.	37007804	37008004	-	-	37022004	-
1 ft. x 6 ft.	37007806	37008006	-	-	-	-
2 ft. x 2 ft.	37007902	37008102	37012602	37012702	37022102	37009402
2 ft. x 3 ft.	37007903	37008103	37012603	37012703	37002103	37009403
2 ft. x 4 ft.	37007904	37008104	37012604	37012704	37022104	37009404
2 ft. x 6 ft.	37007906	37008106	37012606	37012706	37022106	37009406
2 ft. x 8 ft.	37007908	37008108	37012608	37012708	37022108	37009408
2 ft. x 10 ft.	37007910	37008110	37012610	37012710	37022110	37009410
2 ft. x 12 ft.	37007912	37008112	37012612	37012712	-	37009412

Mesh Mat

Encased in stainless steel mesh

Insulation Pad

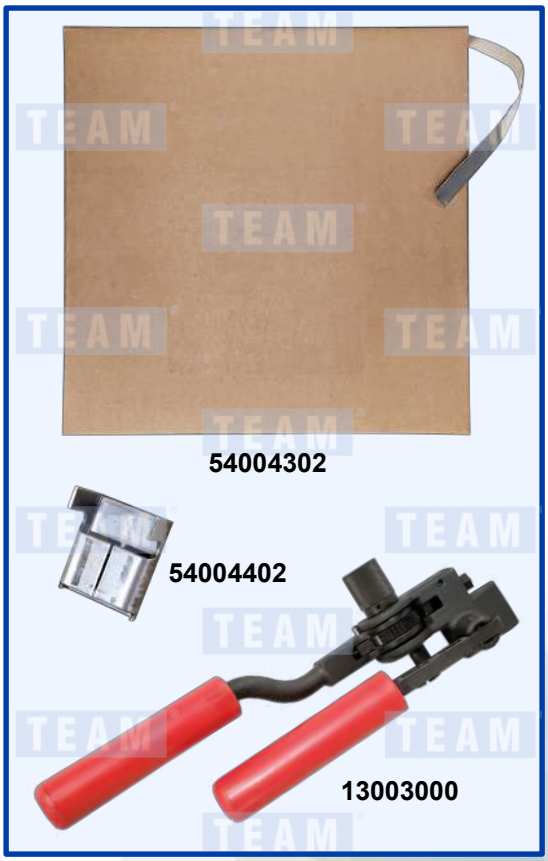
Encased in silica cloth

Additional sizes are also available, contact your TISI sales representative for more information.

Insulation Attachment

Insulation is secured to work piece surfaces by a variety of means: banding, capacitance discharge-welded pins and retaining clips, tape or iron wire. TISI is a source for banding and insulation tools as well as pins, retaining clips and stud welders. All stud welding pins and clips are 12-gauge. Other sizes are available, contact your sales representative for more information.

Part Number	Description
54004302	Banding, Stainless Steel, ½-inch wide, 200 ft./roll
54004402	Clip, Winged, Stainless Steel, ½-wide
13003000	Banding Tension Tool
54008600	Fiberglass Tape, ¾-inch wide, 250 ft./roll
55004700	Wire, Iron Tie, 16-gauge, 3.5 lbs./roll



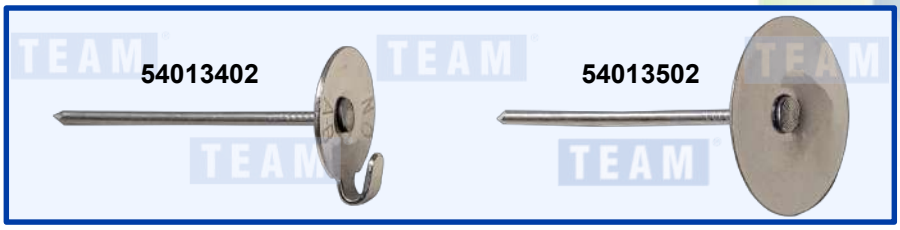
Stud Welder Specifications

Weight	26 lbs. (without gun and cables)
Height	8 ½ inches
Width	10 inches
Depth	13 inches
Weld Rate	Up to 20/minute
Weldable Materials	Mild and Stainless Steel, Aluminium
Pin/Stud Range	14-gauge through ¼-inch diameter weld base
Weld Voltage	35-175VDC
Capacitance	70,000 Mfd
Weld Mode	Contact
Power Requirement	115VAC, 60 Hz, 20-Amp

Part Number	Description
13002803	Stud Welder, Eagle
13006417	Collet, Bullet-style (no stop required)
13006401	Collet, 'B'-style (requires stop – 13006414)
13006414	Stop for 'B' Collet
13006402	Collect Protector

Insulation Attachment

Part Number	Description	Size	Material	Shape
54010501	Stud Weld Pin	3-inch	Mild Steel	Pointed
54010502	Stud Weld Pin	6-inch	Mild Steel	Pointed
54010503	Stud Weld Pin	3-inch	Mild Steel	Blunt
54010504	Stud Weld Pin	6-inch	Mild Steel	Blunt
54010702	Stud Weld Clip	1 ½-inch	Mild Steel	Round
54010712	Stud Weld Clip	2 ½-inch	Mild Steel	Square
54010401	Stud Weld Pin	3-inch	Stainless Steel	Pointed
54010402	Stud Weld Pin	6-inch	Stainless Steel	Pointed
54010403	Stud Weld Pin	3-inch	Stainless Steel	Blunt
54010404	Stud Weld Pin	6-inch	Stainless Steel	Blunt
54010700	Stud Weld Clip	1 ½-inch	Stainless Steel	Round
54010710	Stud Weld Clip	2 ½-inch	Stainless Steel	Square
54013402	Lacing Anchor	2 ½-inch	Stainless Steel	Pointed
54013403	Lacing Anchor	4 ½-inch	Stainless Steel	Pointed
54013501	Quilting Pin	1 ½-inch	Stainless Steel	Pointed
54013502	Quilting Pin	2 ½-inch	Stainless Steel	Pointed
54013503	Quilting Pin	4 ½-inch	Stainless Steel	Pointed



Case Quantities

Parts are available as less than case/spool/bag quantities except where noted. Common part case quantities and their minimum order increments are listed below.

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Part Number	Case Quantity	Order Increment
45020502	1	1
45020501	1	1
45000302	2	1
45000301	25	1
45033100	1	1
45030900	1	1
45031000	1	1
45011900	1	1
45009800	25	1
45009801	25	1

Part Number	Case Quantity	Order Increment
45020100	1	1
45020200	1	1
45020300	1	1
45020400	1	1
45004000	1	1
45033200	1	1
45033300	1	1
45030800	1	1
45012000	1	1
45013000	1	1

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Part Number	Case Quantity	Order Increment
59004901	1	1
59001300	18	1
59001400	50	1
59003601	1	1

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Part Number	Case Quantity	Order Increment
52005901	12	1
52005902	12	1
59005904	12	1

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Part Number	Spool Quantity	Order Increment
55002700	1,000	25
55002401	500	10
55002601	1,000	10

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Part Number	Bag Quantity	Order Increment
56000400	50	1
56001400	50	1
56000500	50	1
56001600	50	1
56001700	50	1

Part Number	Bag Quantity	Order Increment
56000600	100	1
56002000	100	1
56000700	100	1
56002200	100	1
56002300	100	1

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Part Number	Spool Quantity	Order Increment
49000200	5,000	10
49000500	500	50
49000600	500	50
49009000	500	50

Case Quantities

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Part Number	Case Quantity	Order Increment
49000900	100	1
49001000	100	1

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Part Number	Case Quantity	Order Increment
49001800	1,250	1
49001900	1,250	1
49002000	1,250	1

Part Number	Case Quantity	Order Increment
37000100	12	1
37000101	12	1

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Part Number	Case Quantity	Order Increment
51000100	1,000	1
51000200	1,000	1
51000300	1,000	1
51000400	1,000	1
51000500	2,500	1
51000600	2,500	1

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Part Number	Case Quantity	Order Increment
54004302	5	1
54004402	1,000	1

Part Number	Case Quantity	Order Increment
54008600	48	1
55004700	20	1

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Part Number	Case Quantity	Order Increment
54010501	1,000	1
54010502	1,000	1
54010503	1,000	1
54010504	1,000	1
54010702	1,000	1
54010712	1,000	1
54010401	1,000	1
54010402	1,000	1
54010403	1,000	1
54010404	1,000	1
54010700	1,000	1
54010710	1,000	1
54013402	1,000	1
54013403	1,000	1
54013501	1,000	1
54013502	1,000	1
54013503	1,000	1