SCC Inc.

Touchscreen Kit

Product Description

Touchscreen kits (TSK) provide centralized, local annunciation, BMS connectivity, data collection, trending, email access, and remote access for any burner or boiler via a human machine interface (HMI).

Sample Specification

1. The TSK shall be compatible with steam and hydronic systems.
2. The TSK shall be capable of monitoring the following expansion options via Modbus RTU or Modbus TCP/IP:
   - Feedwater systems
   - Circulating pumps with or without VFD control
   - Economizers
   - Other user-specified analog devices
3. The TSK shall be capable of providing draft control for sequencing, via an expansion option.
4. The standard BMS communication interface shall be via Modbus TCP/IP. Modbus RTU, LonWorks, BACnet/IP, BACnet MS/TP, Ethernet/IP, Profinet, Profibus, Metasys N2, or Ethernet/IP (Allan Bradley) shall be available via an optional interface.
5. The TSK shall be compatible with a Lead/Lag Master Panel.
6. The TSK shall have the following standard HMI component options:
   - Schneider Electric HMISTU855 touch panel:
     o 5.7 inch, 320x240 (QVGA) pixel TFT display
     o 8-bit color depth
     o NEMA 4X rating
   - Schneider HMIDT542 touch panel, with HMIG3U base unit:
     o 10.4 inch, 800x600 (SVGA) pixel TFT display
   - Schneider HMIDT642 touch panel, with HMIG3U base unit:
     o 12.1 inch, 1024x768 (XGA) pixel TFT display
   - Schneider HMIDT732 touch panel, with HMIG3U base unit:
     o 15.1 inch, 1024x768 (XGA) pixel TFT display
   - HMIDT542/HMIDT642/HMIDT732 characteristics
     o 16 million colors
     o NEMA 4X rating
     o CPU RISC 600MHz
     o 512 kB NVRAM (backup memory)
     o 256 MB RAM (internal memory)
     o 1 GB SD card

- o Two (2) USB ports
- o Two (2) COM ports
- o Two (2) Ethernet port
- o 16 million colors
- o NEMA 4X rating
- o CPU RISC 600MHz
- o 512 kB NVRAM (backup memory)
- o 256 MB RAM (internal memory)
- o 1 GB SD card
- o Two (2) USB ports
- o Two (2) COM ports
- o Two (2) Ethernet port

7. Selected boiler operating data shall be displayed on the HMI to monitor boiler operation. This data includes:

- Current setpoint
- Actual process value
- Current fuel
- Startup counter
- Hour counter
- Phase of operation
- Firing rate
- Flame signal
- Actuator positions
- VSD percent
- Boiler shell temperature
- Ambient air temperature
- Flue gas temperature
- Efficiency
- O_2 percent
- Lead/Lag status

8. Additional data that shall be displayed:

- Static burner/boiler control data, such as version and identification numbers
- Fuel statistics
- Detailed annunciation of burner/boiler control inputs and outputs
- Lockout and fault log history
- Feedwater status on steam systems, when optioned
- Feedwater PID loop control on steam systems with expanded annunciation option
    - o Single or Three element feedwater control
- Expanded annunciation status, available on expanded annunciation option

- Analog input data, available on expanded annunciation option
- Circulating pump status, available on hydronic systems with expanded annunciation option
- Circulating pump PID loop control, available for hydronic systems or steam coil boilers with expanded annunciation option

9. The following functionality shall be possible with a tablet or smart phone, via remote access:
   - Remote setpoint or output of the load controller is possible via BMS
   - A watchdog timer shall be provided so that the load controller will revert to local operation upon loss of communication
   - A virtual Hand-Off-Auto switch shall be provided to allow an override of the remote control, or to provide an off signal to the load controller
   - Direct manual firing rate control shall be possible in Hand position

10. The TSK shall have a base expanded annunciator option. The expanded annunciator hardware shall be a Schneider Electric TM241C24T PLC, with a built-in TMES4 four-port Ethernet switch:
    - The expanded annunciator option shall allow up to thirteen (13) individual limit points to be labeled and monitored:
      - Each limit point shall be configurable to alarm as a first-out input
      - Each alarm shall be configurable to reset automatically or manually
      - The configuration data shall be stored in non-volatile EEPROM, and shall be available via BMS and locally on the HMI
    - The expanded annunciator option shall include two (2) digital outputs, configurable to monitor up to two (2) data points each:
      - Each output shall include logic and timers, programmable for a variety of user conditions
      - Data points shall duplicate the Modbus point list, and shall be available via BMS and locally on the HMI
    - The expanded annunciator option shall offer an option to allow up to four (4) additional analog inputs and two (2) analog outputs, using the Schneider Electric TM3AM6 analog input/output module:
      - Analog inputs:
        - Each input shall be sink or source 0-20mA, 4-20mA, 0-10V, or 2-10V
        - Each input shall be configurable to include low or high limit alarms
        - Each alarm shall be configurable to reset automatically or manually
        - Each input shall be configurable to provide totalization by the minute or hour
        - The configuration data shall be stored in non-volatile EEPROM, and shall be available via BMS and locally on the HMI
      - Analog outputs:
        - Each output shall be configurable to monitor a data point within the configured scaling
        - Each output shall be configurable to 0-20mA, 4-20mA, 0-10V, or 2-10V
        - The data points shall duplicate the Modbus point list, and shall be available via BMS and locally on the HMI

- o Dedicated Analog Outputs 4-20 ma:
  - Each output is preconfigured to control a feedwater valve for single element or three element feedwater control when optioned
  - Each output shall be configurable to control a VFD for a circulating pump on hotwater system, or circulating pump on coil boiler when optioned
- The expanded annunciator option shall offer an option to allow up to four (12) additional analog field configures for Pt1000 or LG-Ni 1000 RTD inputs, 4-20 ma inputs with no totalization, Type K or J Thermocouples. using the Schneider Electric TM3TI4 RTD input module:
  - o Each input shall be configurable to include low or high limit alarms
  - o Each alarm shall be configurable to reset automatically or manually
  - o The configuration data shall be stored in non-volatile EEPROM, and shall be available via BMS and locally on the HMI
- The expanded annunciator option shall offer an option to monitor an economizer using Pt1000 or LG-Ni 1000 RTD inputs, with the Schneider Electric TM3TI4 universal input module:
  - o The stack input temperature source shall be configurable to be provided by either the load controller or via the analog input
  - o The configuration data shall be stored in non-volatile EEPROM, and shall be available via BMS and locally on the HMI
- The expanded annunciator option shall offer a draft control option to interface with draft dampers and actuators:
  - o The draft control shall interface directly with the load control using Modbus RTU or Modbus TCP
  - o The draft control shall sequence based upon the burner control phase
  - o The position of the dampers shall be displayed graphically on the HMI
  - o Manual position control shall be possible
  - o A virtual Open-Auto switch shall be provided to allow an override to the open position
  - o The data shall be available via BMS and locally on the HMI
- The expanded annunciator option shall be configurable to operate as a burner/boiler control:
  - o Connection of a process variable to any of the configured analog or universal inputs
  - o Connection of an additional sensor, for alarm purposes, to any of the configured analog or universal inputs
  - o On and off hysteresis settings
  - o Proportional, integral, and derivative settings (PID)
  - o Configurable thermostat and alarm outputs, as programmable digital outputs
- The expanded annunciator configuration shall be capable of being backed up to a USB drive for archiving or migrating to similar installed TSKs:
  - o The backup file shall be in CSV format and shall be capable of offline editing
- The expanded annunciator option shall offer a circulating pump control for hydronic systems:

- o The circulating pump shall be configurable to run continuously, or to cycle with the boiler. When the option to cycle with the boiler is selected, the pump shall run for a selectable off-delay period following boiler shutdown
  - o An input for proving pump operation via current switch, flow switch, or differential pressure switch shall be an option. An alarm shall be generated by the TSK if pump operation is not proven when a run command is issued
- The expanded annunciator option shall be capable of serial connection for up to two additional controls using Modbus RTU. A screen on the HMI shall be provided to graphically represent the controls.

11. The TSK shall be configurable to monitor controls when used in a feedwater application. A screen shall be provided to graphically represent the vessel and the percentage of fill.

12. The TSK shall be capable of sending configuration data and monitoring a Yaskawa, Danfoss, PowerFlex, ABB, and Delta Variable Speed Drives (VSD), This data includes:
- Reference percent
- Reference hertz
- Output percent
- Output hertz
- RPM
- Output current
- Maximum output current
- Output voltage
- DC bus voltage
- Maximum DC bus voltage
- Output power
- Output power totalization
- Current fault message
- Current alarm message
- Alarm, fault, ready, idle, running, and speed agree indicators
- Configurable ramp times
- Configurable motor nameplate data
- Configurable braking resistor status

13. The TSK shall have the ability to generate a graphical combustion curve for the air, fuel, auxiliary 1 or auxiliary 3 actuators, and the VSD:
- The curve shall be generated at load increments of 10% on the 5.7 inch TSK, and 5% on the 10.4 12.1" and the 15" inch TSK
- The graph data shall be saved on a USB drive in CSV format
- The graph data shall be readable from any text editor or spreadsheet application
- When email is configured, the TSK shall be capable of emailing graph data
- The combustion data points shall be available via BMS

14. The TSK shall include four (4) local trend graphs that are each configurable for up to two (2) data points:
    - The data points shall duplicate the Modbus point list, and shall be available via BMS
    - The time base shall be adjustable in pre-defined settings, ranging from 10 seconds to 60 minutes per sample

15. The TSK shall include the ability to datalog up to eight (8) data points:
    - The data points shall duplicate the Modbus point list, and shall be available via BMS
    - The time base shall be adjustable in pre-defined settings, ranging from 10 seconds to 60 minutes per sample
    - The datalog shall be saved on a USB drive in CSV format
    - The datalog shall be readable from any text editor or spreadsheet application
    - The datalog file name shall include the date
    - A new datalog file shall be created daily for archiving information
    - When email is configured, the TSK shall be capable of emailing the daily datalog

16. The TSK shall annunciate the presence of local alarms on the HMI, with the capability to store the latest 250 alarms:
    - The newest alarm shall replace the oldest alarm
    - When email is configured, the TSK shall send current alarms via email
    - Different alarm categories shall be color-coded
    - The capability to save the complete alarm history on a USB drive

17. The TSK shall be configurable to operate in conjunction with a Lead/Lag Master Panel:
    - The TSK shall be uniquely addressed by boiler number
    - All configuration and clock data shall come from the Lead/Lag Master Panel
    - When a communication failure occurs, local boiler operation shall resume, and an alarm shall be generated

18. When not connected to a Lead/Lag Master Panel or Protocol Converter, the IP address shall be capable of being changed as needed.

19. Clock data entered into the TSK shall automatically be synchronized to any connected devices with an internal clock.

20. Two levels of security shall exist to protect configuration and operation settings:
    - The first level of security shall allow the operator to change settings required for daily operation
    - The second level of security shall allow first level access, and additionally allow changes to configuration options

21. The TSK shall be capable of displaying all screens in either English or Spanish.

22. The TSK shall include multiple burner/boiler display options.

23. The TSK shall include a screen saver with multiple time options, including the ability to disable the screen saver altogether.

24. The screen saver shall prominently display the setpoint, actual value, and firing rate, as well as graphically represent the current phase.

25. The TSK shall be capable of sending email to a maximum of six email addresses. A macro shall be provided to allow mobile phones to receive text messages as well.

26. Emails shall be sent for the following:

- Any alarm conditions
- Static burner/boiler control data
- Fuel statistics
- Lockout and fault history
- Screen snapshots
- Daily datalog summaries
- Combustion curve data

27. The TSK shall be capable of connecting to a Protocol Converter to allow LonWorks, BACnet/IP, BACnet MS/TP, Metasys N2, or Ethernet/IP (Allan Bradley) communications:

- LonWorks:
  - The status of the connection shall be monitored. An inactive connection shall cause local operation to be forced onto the burner/boiler control
  - The physical medium shall be FTT-10A
- BACnet/IP:
  - The status of the connection shall be monitored. An inactive connection shall cause local operation to be forced onto the burner/boiler control
  - The IP address and device instance of the BACnet/IP connection shall be adjustable via a standard web browser
- BACnet MS/TP:
  - The status of the connection shall be monitored. An inactive connection shall cause local operation to be forced onto the burner/boiler control
  - The MAC address and device instance of the BACnet MS/TP connection shall be adjustable via a standard web browser
  - The baud rate of the BACnet MS/TP connection shall be adjustable from 9600 to 76800, in standard increments
- Metasys N2:
  - The node address of the Metasys N2 connection shall be adjustable via a standard web browser
- Ethernet/IP:
  - The status of the connection shall be monitored. An inactive connection shall cause local operation to be forced onto the burner/boiler control
  - The IP address and device instance of the Ethernet/IP connection shall be adjustable via a standard web browser
- Profinet:
  - The status of the connection shall be monitored. An inactive connection shall cause local operation to be forced onto the burner/boiler control
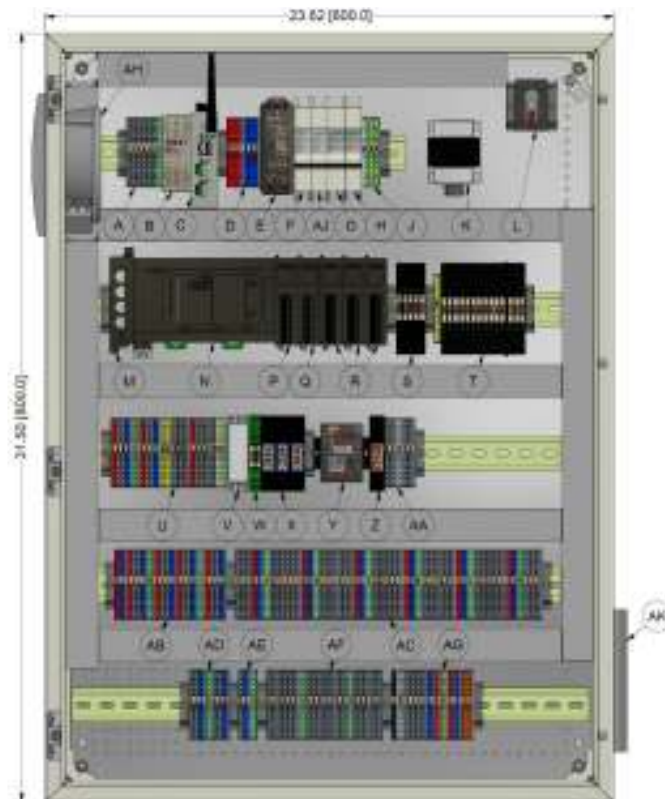
- o The IP address and device instance of the Profinet/IP connection shall be adjustable via a standard web browser
- Profibus:
  - o The status of the connection shall be monitored. An inactive connection shall cause local operation to be forced onto the burner/boiler control
  - o The address and device instance of the Profibus connection shall be adjustable via a standard web browser
  - o The baud rate of the Profibus connection shall be adjustable from 9600 to 76800, in standard increments

FAILURE OF ANY COMPONENT WITHIN THE TSK (Touchscreen or PLC) WILL NOT RESULT IN LOSS OF BOILER OPERATION. OPERATION WILL REVERT TO LOCAL PID CONTROL, LOCATED IN THE RWF10/RWF55/LMV5, UTILIZING A PRE-PROGRAMMED LOCAL SETPOINT. HYDRONIC PUMP OUTPUTS, IF USED, WILL FAIL TO THE ON CONDITION.

Dimensions
For dimensions, reference TS-1000 data sheet.

Parts Description included when optioned (See TS-1100)

A	Modbus RS232 and RS485 Terminals	Standard Component		T	120 VAC SPDT Relays	Annunciation/Draft Control
B	RS232 to RS485 Converter	Touchscreen Location 15ft or More Away from AZL		U	Draft Control Terminals	Draft Control
C	BMS Communication BACnet/LON/N2/RTU	BMS Communication Other than Modbus TCP/IP		V	Off Delay Timer	Draft Control
D	24 VDC Terminals	Standard Component		W	24 VDC Solid State Relays	Draft Control
E	24 VDC Power Supply	Standard Component		X	24 VDC DPDT Relays	Draft Control
F	1 Amp Draft Control Circuit Breaker	Draft Control		Y	Manual Reset Warrick Relay	Manual Reset Warrick Relay
G	3 Amp Load Control and Water Level Control Circuit Breaker	Load Control/Water Level Control		Z	120VAC DPDT Relay	Manual Reset Warrick Relay
H	3 Amp Main Circuit Breaker	Standard Component		AA	Warrick Relay Terminals	Manual Reset Warrick Relay
J	Neutral and Ground Terminals	Standard Component		AB	Dedicated Analog Input Terminals	(4) Dedicated Analog Inputs and (2) Analog Outputs
K	24 VAC SKB/C or D Transformer	Water Level Control		AC	General Analog Input Terminals	(4), (8) or (12) additional Universal Input Terminals
L	16 Amp Non-Fused Disconnect	Standard Component		AD	Analog Output Terminals	(4) Dedicated Analog Inputs and (2) Analog Outputs
M	Ethernet Switch	Annunciation or BACnet/IP, or Ethernet/IP BMS Communication		AE	PLC Feedwater/Water Level or Circulating Pump VFD Control Terminals	PLC Feedwater/Water Level or Circulating Pump VFD Control
N	Programmable Logic Controller (PLC)	Annunciation or Draft Control		AF	Load Control Terminals	Load Control
P	Analog I/O Module	(4) Analog Inputs and (2) Analog Outputs		AG	Water Level Control Terminals	Water Level Control
Q	Analog Output Module	PLC Feedwater/Water Level or Circulating Pump VFD Control		AH	Cooling Fan	Cooling Fan
R	Analog Input Module(s)	(4) Universal Inputs per Module		AJ	2A Cooling Fan Breaker	Cooling Fan
S	24 VDC SPDT Output Relays	Annunciation		AK	Air Intake Filter	Cooling Fan

Note: Reference TS-1000 data sheet for various TSK part numbers and part descriptions

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