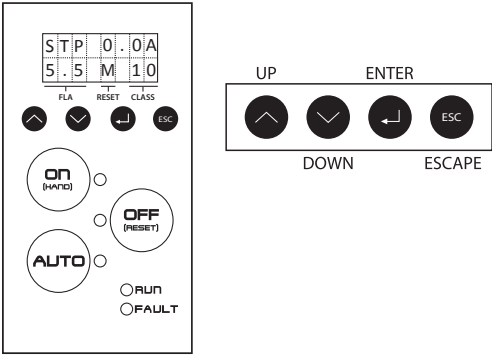# Operation

⚡ ⚠ DANGER

- Ensure that all connections are properly torqued and enclosure is closed prior to applying power to the device.
- Ensure all mechanical equipment operated by the starter is clear for safe operation in case of starter activation.
- When in AUTO mode, starter may be activated remotely by the control system

Keypad Interface


```
STP 0.0A
5.5 M 10
```
FLA   RESET   CLASS

UP   ENTER
⌃ ⌄ ↵ ESC
DOWN   ESCAPE

ON (HAND)
OFF (RESET)
AUTO
○ RUN
○ FAULT

Operation Modes

ON (HAND)
Press the ON mode button to manually engage motor.

OFF (RESET)
Pressing the OFF mode button manually disengages the motor. Additionally, the OFF button serves as a manual Reset. Press and hold OFF for 5 seconds to Reset the starter after a fault trip.

AUTO
When utilizing AUTO mode, the starter is controlled by a remote Start/Stop command.

LED Status Indicators

MODE LEDs
Illuminates with corresponding mode selection (HAND/OFF/AUTO). Flashing mode LED signals a fault trip during the last operating mode. All 3 mode LEDs will flash simultaneously during Shutdown or Fireman's Override operation.

RUN LED
Illuminates when starter is given a Run signal and proof of power is detected. LED will flash when Run signal is present without proof of power to the motor.

FAULT LED
Illuminates upon a fault condition or overload trip. Starter must be returned to the OFF mode in order to Reset. A 180 second minimum cool down period must elapse prior to further operation.

Lockout Settings & Overload Adjustment

The TAS Starter is pre-configured to protect the motor based on customer selected specification. If adjustments need to be made to any of the protective functions of the TAS starter, the settings must first be unlocked. To unlock the TAS settings, follow the steps below.
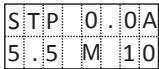
```
STP 0.0A
5.5 M 10
```
Default Display Screen

⌃ ⌄
Press and hold the UP and DOWN buttons for 2 seconds until the display screen matches the display at left.

```
SETTINGS
LOCKED ↵
```

↵
Press the ENTER button to change the menu from "LOCKED" to "UNLOCKED."

```
SETTINGS
UNLCKD ↵
```

ESC
The lockout feature is now disabled. Press the ESC key to return to the Default Display screen.

```
STP 0.0A
5.5 M 10
```

Adjustments may now be made to the Overload FLA setting and Ground Fault Level setting. The lockout feature will automatically re-enable itself after 2 minutes.

Overload Adjustment (Setting Range 1.0 - 95.0 Amps)
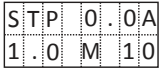
```
STP 0.0A
1.0 M 10
```
Once settings are unlocked, follow the steps below to adjust overload setting.

⌄
Press the DOWN arrow once.

```
EDIT ↵
FLA 1.0A
```
Edit FLA Screen

↵
Press ENTER
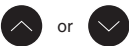
⌃ or ⌄
Use the UP and DOWN keys to make adjustments.

↵
Press ENTER to save setting.

ESC
Press ESC to return to the Default Display screen.

Wiring Schematic

SCM PCB

Dry Inputs
- Common — Normally Closed Input
- Shutdown (Perm Auto) — Normally Open Input
- Auto Run (Perm Auto)

Relay Outputs
- Status
- Common
- Fault

Voltage Inputs
- Auto Run — 12-120VAC/DC Input
- Fireman's Override — 12-120VAC/DC Input

Actuator Control
- Motor — 24VAC, 1A Output
- Limit Switch — Normally Open Input
- Common

A1 M A2

CPT   24V

CAT 5 Input

120V 208V 240V 480V
1   2   3   4   5
H1   H4

1PH: L1 L2 / MCP / H1 H4 / M / 13 21 14 22 / OL / A B C / CAT 5 Output / T1 T3 / M

3PH: L1 L2 L3 / MCP / H1 H4 / M / 13 21 14 22 / OL / A B C / CAT 5 Output / T1 T2 T3 / M

Taco   TAS SMARTSTART PUMP

Installation & Operation Guide

This manual is available for download at www.taco-hvac.com

c(UL)us LISTED   CE

Precautions

To prevent injury and property damage, follow these instructions. Failure to adhere to installation/operation procedures and all applicable codes may result in hazards as indicated by warning codes outlined below:

⚠ DANGER
indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.

⚠ WARNING
indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION
indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

⚠
This is the safety alert symbol. Read and follow instructions carefully to avoid a dangerous situation.

⚡
This symbol alerts the user to the presence of "dangerous voltage" inside the product that might cause harm or electrical shock.

Safety Instructions

⚡ DANGER
Equipment can start automatically. Lockout/tagout before servicing.

⚠ CAUTION
As with all electrical products, read manual thoroughly. Only qualified, expert personnel should perform maintenance and installation. Contact the nearest authorized service facility for examination, repair, or adjustment. Do not disassemble or repair unit unless described in this manual; death or injury to electrical shock or fire hazard may result. Specifications and manual data subject to change. Consult factory for additional information.

Installation

⚠️⚠️ DANGER

HAZARDOUS VOLTAGE
• Disconnect and lock out all power before installing or servicing equipment.
• This equipment may require locking out multiple power sources prior to service
• Install and wire in accordance with all applicable local & national electrical and construction codes

FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN DEATH OR SERIOUS INJURY

Mounting
Mount the starter on a vertical surface, with the line terminals facing up. Install using 1/4" diameter hardware suitable for the mounting surface.

⚠️ WARNING

• To maintain overcurrent, short-circuit, and ground-fault protection, the manufacturer's instructions for selecting current elements and setting the instantaneous-trip circuit breaker must be followed.
• Tripping of the instantaneous-trip circuit breaker is an indication that a fault current has been interrupted. Current-carrying components of the magnetic motor controller should be examined and replaced if damaged to reduce the risk of fire or electric shock. If burnout of the current element of an overload relay occurs, the complete overload relay must be replaced.
• Do not locate starter in an environment subject to flammable gases, dusts or materials. Contact arcing can induce explosion or fire.
• Locate starter in a location appropriate to enclosure ratings and operational ratings.
  (e.g. NEMA 1 should only be located in a dry, protected environment).
• Do not allow any metal shavings or debris from installation to enter enclosure.

Wiring
Wire main power input and motor leads to the appropriate terminals tightened to specified torques indicated in the Torque Table below. Use only copper conductors rated at least 60°C for applications less than 100A and at least 75°C ≥ 100A. Maintain proper clearances and verify that no possibility of an electrical short exists between the power conductors or enclosure. Ensure that wires are not under stress and all insulation is intact. Verify voltage input matches label and the control power is tapped per schematic.

Low Voltage Wiring
Automation system control wiring should be run in a separate conduit. The control terminals accept 26~14AWG wire torqued to 3.5 in-lb.

Torque Table

| NEMA Size	Input (lb-in)		Output (lb-in)
	Standard	Combination	Motor Leads
00	20	18	20
0	20	18	20
1	20	18	20
2	35	36	35
3	45	53	45
4	80-86	150-180	80-86
5	300-390	180-250	300-390
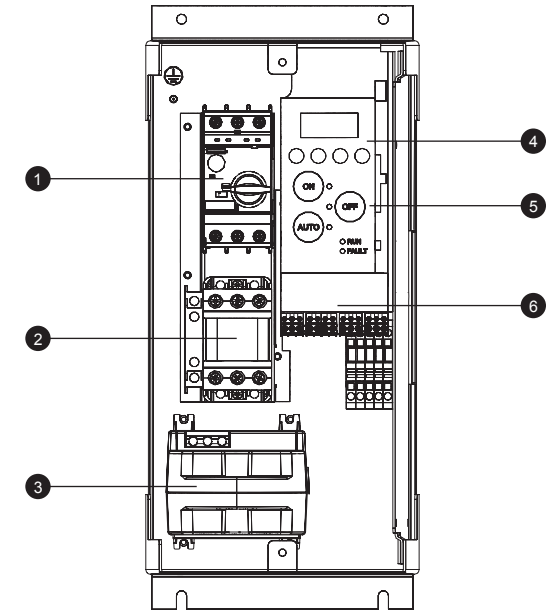
① Motor Circuit Protector Disconnect
② Magnetic Contactor
③ Overload Meter Base
④ LCD Display & Program Buttons
⑤ Hand-Off-Auto Keypad
⑥ Control Terminal Inputs/Outputs

Control Terminals

CONTROL TERMINALS												
ACTUATOR CONTROL			VOLTAGE INPUTS 12-120VAC/DC				RELAY OUTPUTS			DRY INPUTS		
COMMON	LIMIT SW	MOTOR OUT	FIREMAN'S OVERRIDE			AUTO RUN	FAULT	COMMON	STATUS	AUTO RUN	SHUTDOWN	COMMON
A	A1	A2	V1	V2	V3	V4	O1	O	O2	D1	D2	D

Actuator Controls	Interlocks starter with dampers or valves. Motor output provides power to actuator motor (1A maximum @ 24VAC or 0.25A @ 120VAC). Starter enables motor operation upon Limit Switch contact closure.
Voltage Inputs	Accepts building automation system signals. Enable smoke purge operation with the Fireman's Override terminals and automatic run capability via the Auto Run terminals.
Relay Outputs	Confirm motor operation (status) or indicate fault conditions (starter trip) to the building automation system.
Dry Inputs	Initiate automatic run by closing the Auto Run terminal contacts. Typically used with direct sensor control (CO, occupancy or thermostat). Allows shutdown of the starter by opening the shutdown contact (commonly used for fire/smoke alarm applications).

BACnet Communications
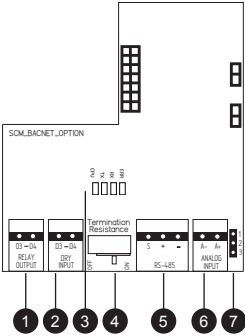
① Relay Output
② Dry Input
③ Status LEDs
④ Termination Resistance Switch
⑤ RS-485 Interface
⑥ Analog Input
⑦ Analog Input Selector Jumper

Relay Output (BV5)	Relay output contact rated for 0.3A @ 125VAC, 1A @ 24VDC.
Dry Input (BI10)	Dry input terminal. Normally open contact or transistorized input.
Status LEDs	**CPU (Green)** *Flashing* - During normal operation, the CPU LED will blink in 1 second intervals. *Off* - BACnet board is not receiving power or potential board malfunction **TX (Green)** The TX LED will flash when the starter is transmitting data. **RX (Green)** The TX LED will flash when the starter is receiving data. **ERR (Red)** The ERR LED will flash if a data interruption occurs between the BACnet board and the starter's main control board. ERR LED will also flash if BACnet communications fail.
Termination Resistance Switch	Select the ON position to enable termination resistor for RS-485 communication.
RS-485 Interface	Connect communication wiring using provided RS-485 terminals.
Analog Input (AI19)	Analog input for 4-20mA, 0-10V or 10KΩ thermistor.
Analog Input Selector Jumper	**No Jumper:** 0-10V Input **Jumper Pin 1 & 2:** 10KΩ Thermistor Input **Jumper Pin 2 & 3:** 4-20mA Input

BACnet Parameter Setup

It may be necessary to adjust settings and configure the starter for proper BACnet operation. From the Default Display screen, access the BACnet parameters to begin setup.

ADV SETTINGS ⌄ — Press and hold the UP and DOWN buttons for 8 seconds to unlock the Advanced Settings. Press the ENTER button to change the menu from "LOCKED" to "UNLOCKED."

EDIT BACNET ⌄ — Press ENTER to access BACnet parameters and begin setup. Use the ARROW keys to navigate through parameters. Press ENTER to confirm your selections.

COM CTRL DISABLED ⌄ — Setting enables or disables communication via BACnet.

COM LOSS NO STOP ⌄ — In the event of a loss in BACnet communications, select if the starter should continue to RUN.

LOSS TM 30s ⌄ — Detects receipt of any ReadProperty or WriteProperty request. When received, resets a running seconds counter which is checked against the COM LOSS parameter.

BAUD RT 76800 ⌄ — Adjust parameter to the desired Baud Rate 9600, 19200, 34800, or 76800.

DEV INST 223000 ⌄ — Assign an inter-network Device Instance to the starter. Select a unique identifier within a range of 1~4194302.

MAC ID 0 ⌄ — Set a unique Media Access Control (MAC) address. Each master device on the MS/TP daisy chain must have a unique MAC address (addressable range 0~127).

MAX MSTR 127 — The Max Master parameter determines the maximum number of possible addresses assigned to the network.

Press ESC to return to the Default Display screen.