

HS588-24VDC Pit Scraper Controller

General Installation Notes:

Make sure that power is disconnected from system prior to servicing.

Installation of this equipment and related OEM equipment should be in accordance with these instructions, OEM's installation instructions and local codes (if applicable). Failure to follow specified instructions may cause damage to equipment and/or personal injury or death.

Take special note of any Warnings or Safety Decals on the equipment and in manuals.

Always wear protective clothing and any applicable Personal Protective Equipment (Safety Glasses and/or Ear Plugs) when working with the equipment.

Discarded materials, equipment and boxes should be recycled in accordance with local and national codes.

Note: Controller is to be wired in accordance with all applicable local and national electrical wiring codes. All wiring sizes and fuse capacities are to be sized according to applicable electrical code specifications or other regulations.

Safety Instructions:

Read all safety messages in this manual and on equipment safety decals. Follow recommended precautions and safe operating practices.

Ground all electrical equipment for safety.

Ground all non-current carrying metal parts to guard against electrical shock.

Always keep safety decals in good condition and replace missing or damaged decals.

Overview:

HS588-24VDC Auto Pit Scraper Control

The Automatic Control System controls the motor power and direction of rotation in order to operate the pit scraper blade through one complete cycle defined as moving the scraper blade from one wall to the opposite wall and back. A 24 HR programmable timer is used to start the cycle. Limit switches are used to provide feedback to the system when the travel limits have been reached. A delay start relay is used to delay the motor operation by approximately 2 seconds to ensure the direction of the motor has been established before energizing the motor. A delay timer relay is used to provide a maximum run time for each operation in the case of a malfunction.

CAUTION: MOTOR START UP IS DELAYED

Operation:

Manual Mode

To operate scraper in manual mode, rotate MAN/AUTO switch to “MAN” position. The scraper will move in the direction selected by the “FWD/REV” switch. The scraper will continue as long as the switch is in the MAN mode, direction is selected, and the scraper blade has not contacted the limit switch in which it was traveling toward. To change direction of scraper blade, simply change direction selection on “FWD/REV” switch. If motor does not operate on initial selection of “MAN” mode and direction selected, then it is likely the scraper is already activating the limit switch for that direction of operation. Changing direction to opposite setting will start motor.

AUTO Mode

In Automatic mode, the scraper motor will operate based on the 24HR timer. Output of the 24HR timer (See SET-UP) is used to signal the start of a scraper cycle. Once triggered with “ON” event, the scraper will travel to the opposite end of the barn. The scraper will stop movement once it has contacted the limit switch or The “MAX RUN” timer has timed out. Once the scraper has stopped, it will remain stopped until the next “OFF” event has been activated which will reverse motor rotation and bring the scraper back to the starting or “HOME” position.

To begin AUTO mode, the scraper blade must be in the “HOME” position.

SET-UP

Initial Set-up

(Verification of Limit Switch arrangement and Motor rotation)

Since arrangement of the pit scraper system can vary, limit switch initial identification and motor rotation upon installation is difficult, however it is easy to verify the correct limit switch is in the correct position or motor rotation is correct. There are two inputs for limit switch connections (see Wiring Instructions). Each limit switch is identified as Limit #1 or Limit # 2. Limit Switch #1 is intended to be the switch that is activated when the scraper returns to the starting position or the “HOME” position. It is important to identify the wall and pit location that will be the “HOME” location. Verify Limit Switches are wired in the correct position and motor rotation is correct by performing the following: **READ BELOW INSTRUCTIONS FULLY BEFORE ATTEMPTING**

1. Manually move the scraper away from end wall a minimum of 6FT [2M].
2. Make sure there are no “ON” events present on the 24HR timer, switch controller to “AUTO” position.
3. The scraper will automatically return to the “HOME” position. If the scraper is not traveling toward the wall that was identified as the “HOME” wall, stop scraper system, disconnect power and swap “RED” and “BLACK” wires at the input terminals #9 and #11 from motor connections to change motor rotation. (See Wiring Instructions – **Figure 5**).
4. Re-connect power and repeat step #2. Scraper direction should have changed and now be traveling toward “HOME” wall.



5. While scraper is moving, activate the limit switch that the blade is traveling towards using a rod or some other method to safely reach the limit switch. While activating the limit switch the scraper motor should stop. **If it does not stop, turn off power immediately before scraper blade is allowed to contact limit switch.**
6. Swap limit switch wiring position in control cabinet (See Wiring Instructions – Figure 5).
7. Manually move scraper away from end wall and repeat steps 2 and 5.

If limit switches are in correct position, activation of the limit switch while scraper is moving toward that same limit switch will stop the motor. Releasing the limit switch will allow scraper motor to restart. Allow scraper motor to run until scraper blade has made contact with limit switch and motor has stopped to confirm proper set-up.

Programming 24 Hour Timer

Always perform programming with power disconnected. The “Red” safety lock-out switch must be “OFF” before opening cabinet door.

24HR timer is used to program the start of a scrape cycle. The “ON” event will signal the blade to travel to the opposite wall. The next “OFF” event will bring the blade back to original starting position.

Setting Clock: REFERENCE FIGURE 1

1. To set time on clock, simply rotate the center portion of the timer display in either direction. Align the short hand with the appropriate hour, and long hand with minutes (same as standard analog clock).

Program “ON” and “OFF” Events

During the programming of the 24HR timer, an “ON” event will equal the time the scraper cycle is to start. An “ON” event can be programmed in a minimum of 15 minute increments by pulling inward the programming tabs. Typically one 15 minute “ON” and one 15 minute “OFF” event is all that is needed for one complete cycle for barn lengths of up to 375FT [114M]. Barn lengths longer than 375FT [114M] will require two “ON” events and two “OFF” events. The “ON” event has to be long enough to allow the scraper blade to travel the full length of the barn based on travel rate of 25FT / MIN [7.6M /MIN].

For example a 200FT [60M] barn will require 8 minutes of travel time, therefore an “ON” event of 15 minutes is sufficient.

An “ON” event is when a single tab on the outer dial of the 24HR timer is pulled inward. This will represent 15 minutes. An “OFF” event is anytime the tabs are down or outward.

Set scraper cycle times:

1. To set the beginning of a cycle, pull inward the tab that corresponds with the time of day the cycle is to start.
2. Set "OFF" time by making sure the next tab in sequence is "Down or Outward".
3. Any rest period between cycles will be represented by the tabs being "Down or Outward".
4. Repeat cycle set up by pulling inward tabs that correspond with time of day the cycle is to start.

A maximum of 48 cycles is available in a 24 hour period for barn lengths of less than 375FT [114M].

For barn lengths greater than 375FT [114M], Two (2) tabs will be required for each "ON" and "OFF" cycle since it will take longer than 15 minutes (length of time of one tab) to travel the distance of the barn. A maximum of 24 cycles will be available.

24HR TIMER

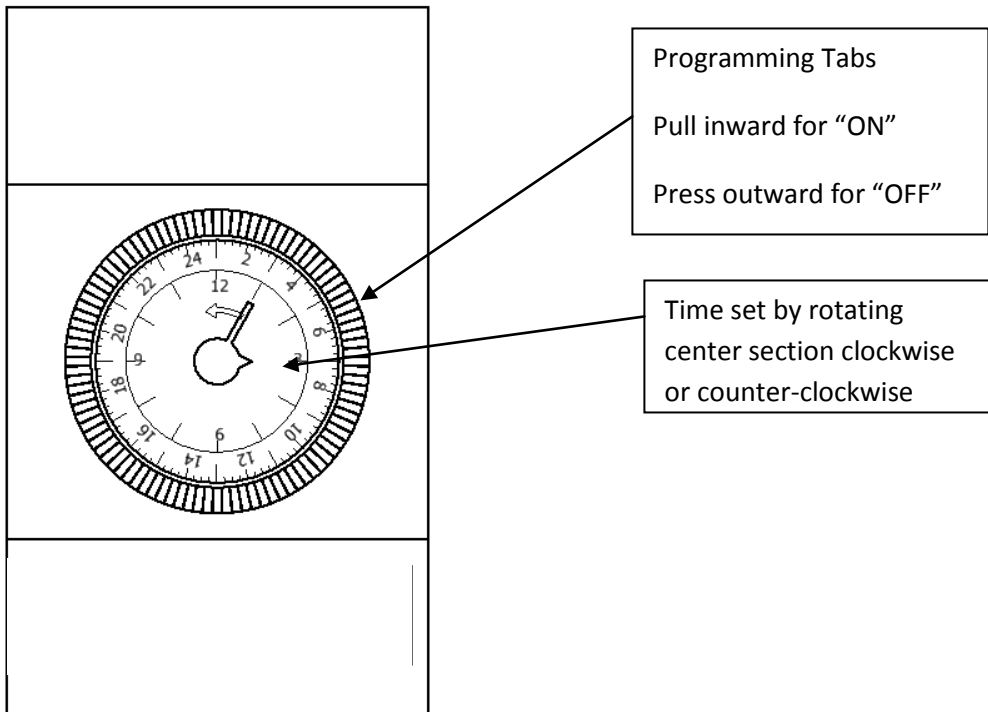


FIGURE 1



Maximum Run Timer Set-up REFER TO FIGURE 2

The Maximum Run Timer limits the amount of time the scraper motor is enabled to run. As a safety precaution, the max run timer disables the power going to the scraper motor while it rest idle between cycles as well as stops the scraper motor in case of a limit switch, belt, cable, or other malfunctions.

Max Run Timer starts at the beginning of an event. Once time has elapsed, the scraper motor will not run until the next "OFF" or "ON" event.

The Max Run Timer should be set for approximately **2 minutes** more than the time it takes the scraper to travel one full length of the barn. This will allow the scraper to travel and contact limit switch. Motor will be disabled and cannot restart after 2 minutes.

Max Run Timer will reset once the next event has occurred to move the scraper in opposite direction.

See **FIGURE 2** for Maximum Run Timer Relay Adjustment dial identification.

The "Range" Dial represents the range of time in seconds (s) or hours (h). Most cases this will be set to 60s.

The "Time" dial is the number to multiply by the range value.

Maximum run time value = "Range setting" x "Time" setting.

For example:

Range setting: 60s

Time setting: 6

Maximum run time = $60 \times 6 = 360$ seconds or 6 minutes.

Barn example:

A 200FT[60M] barn requires 8 minutes to travel full length. Max Run Timer should be set for 10.

Range Dial set to 60s, Time dial set to 10 will equal 10 minutes.

MAXIMUM RUN TIMER RELAY

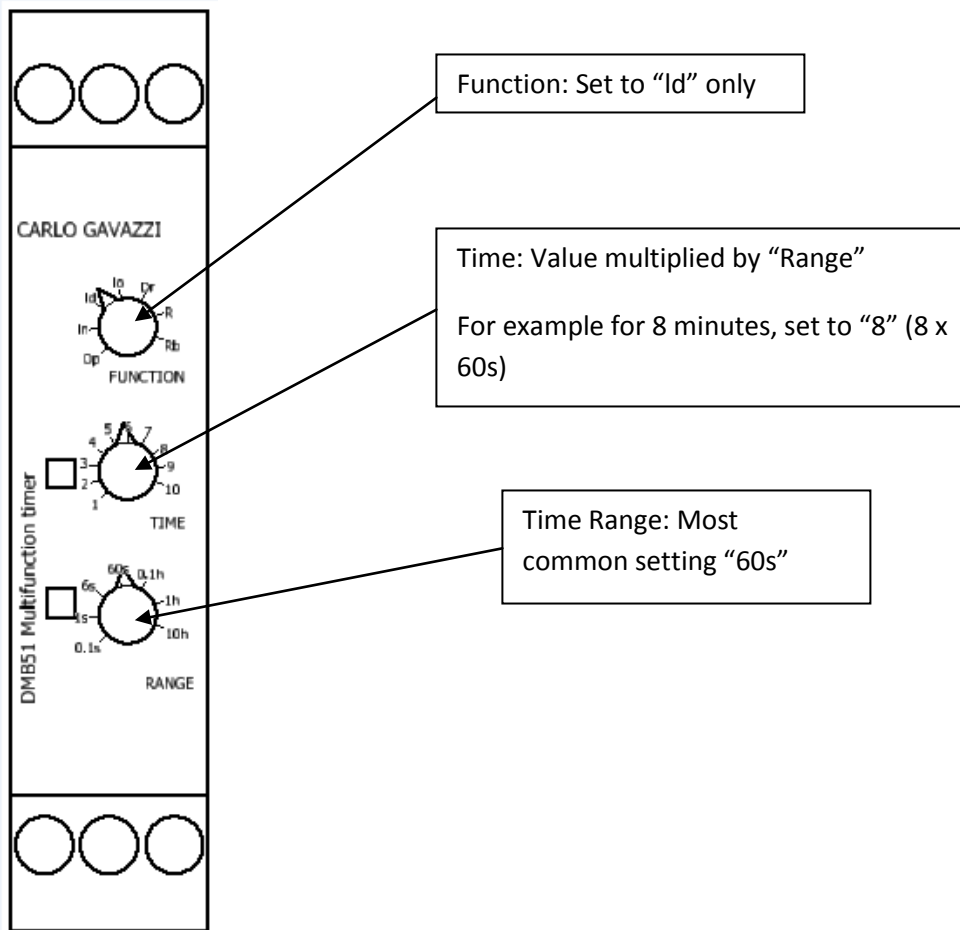


FIGURE 2

HS588-24VDC AUTO PIT SCRAPER CONTROL COMPONENT LAYOUT

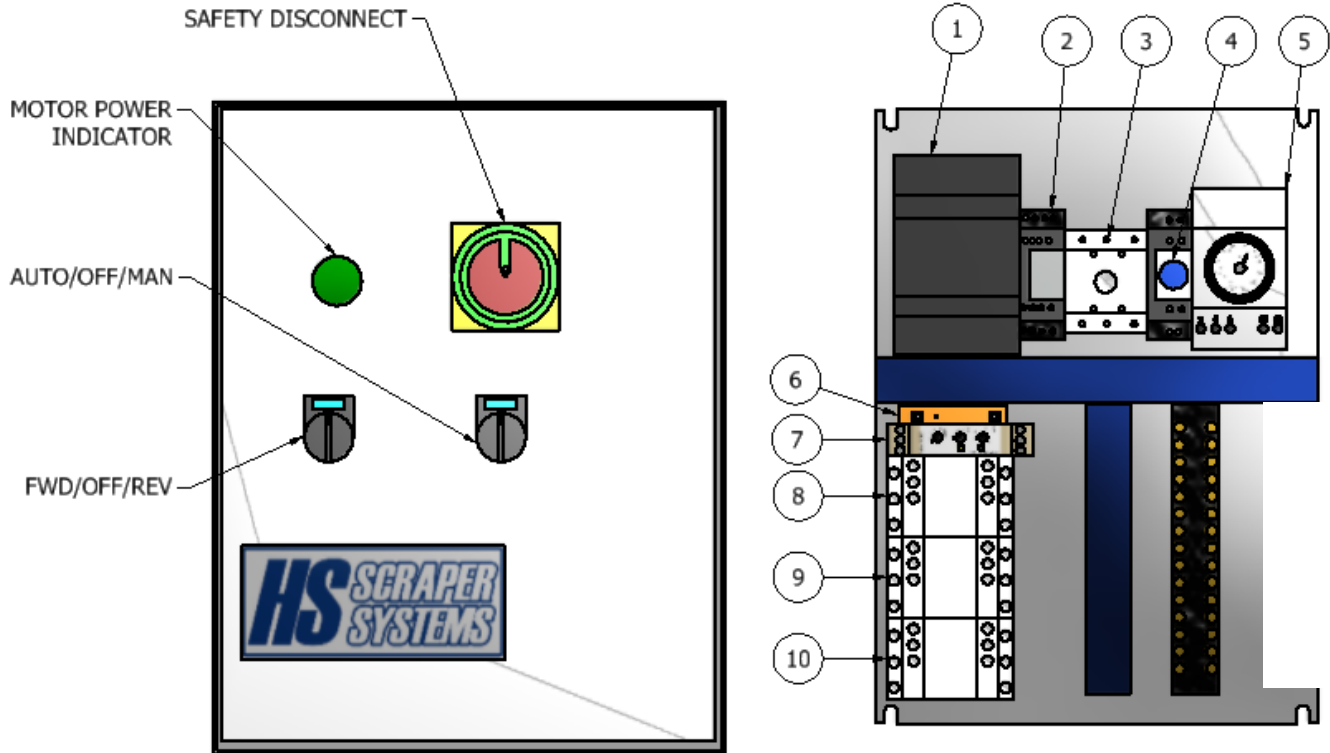
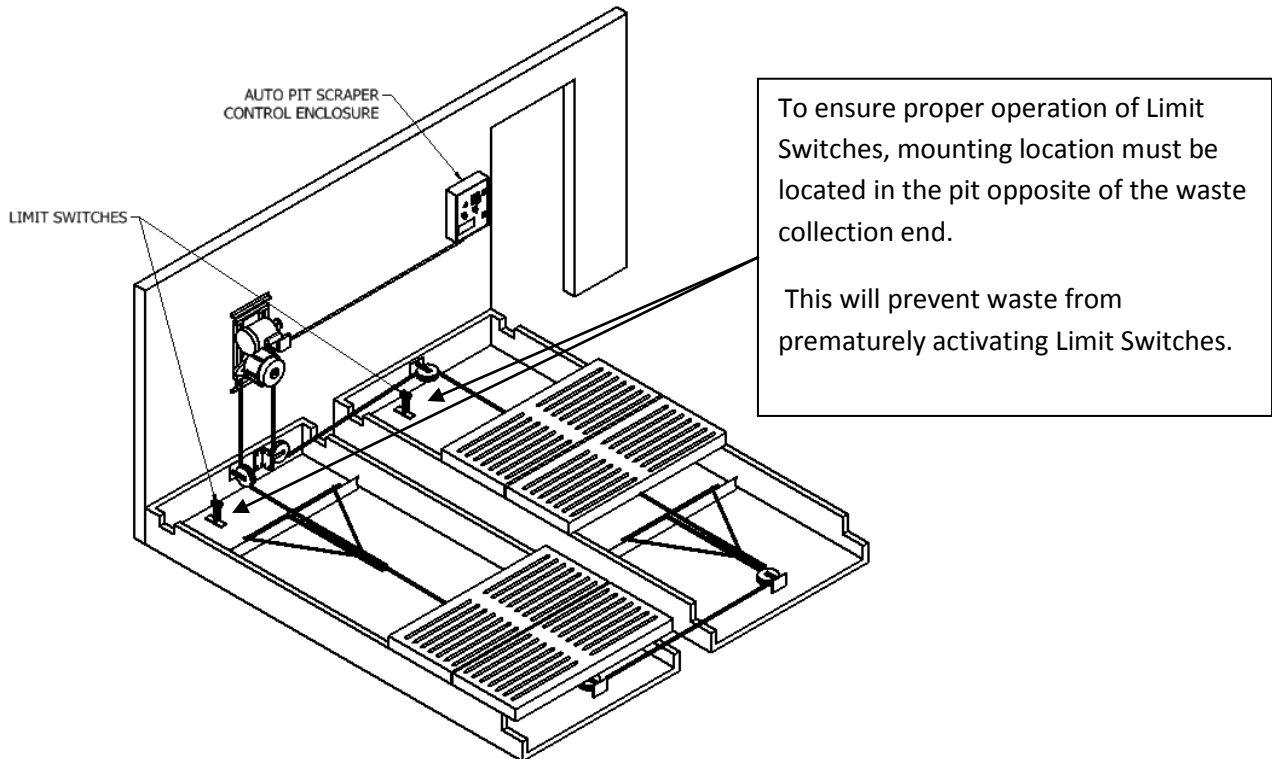


FIGURE 3

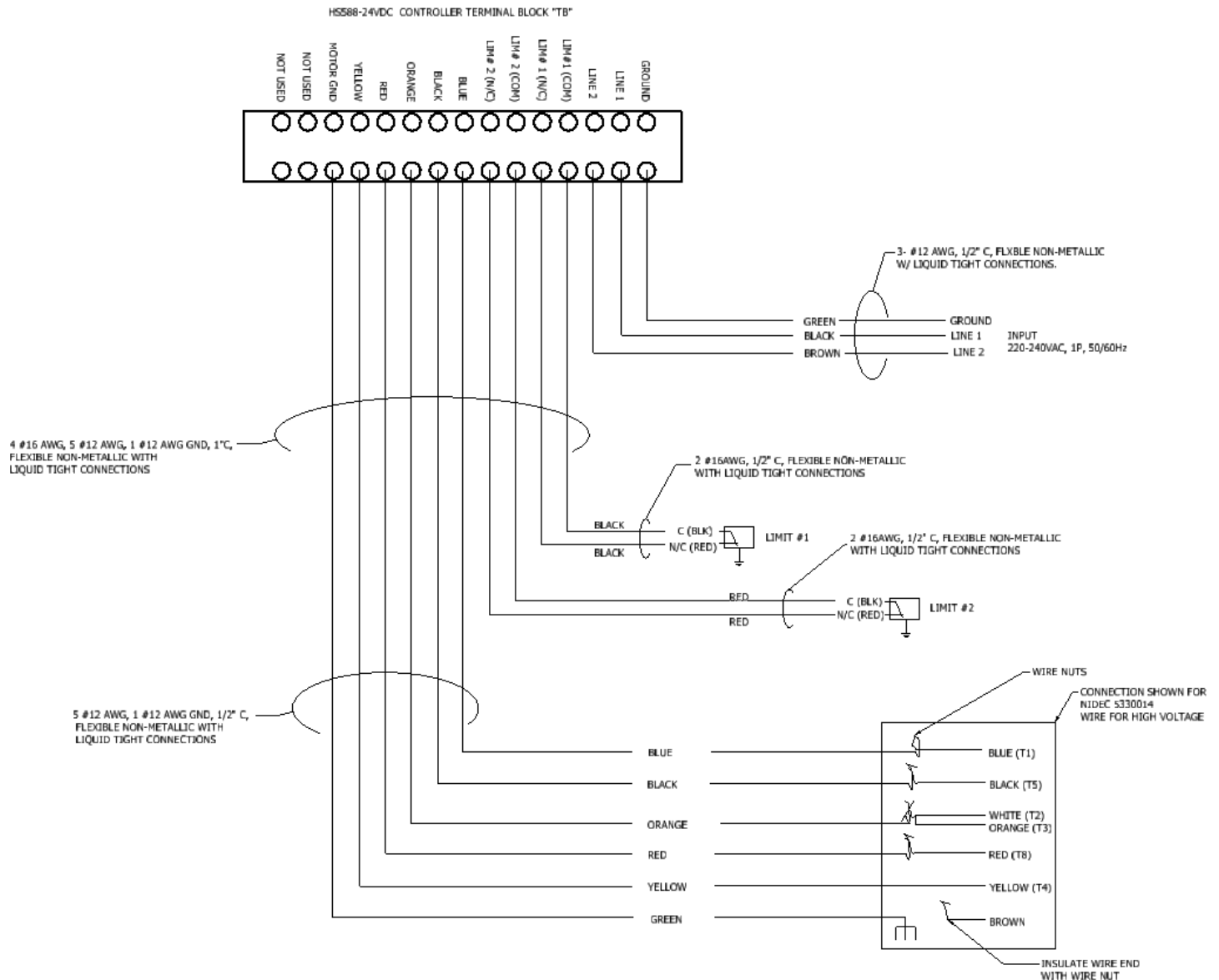
REF #	OEM PART #	Service Replacement #	DESCRIPTION	CIRCUIT ID
1	DR-60-24	EL1168	24VDC, 60W POWER SUPPLY	PS
2	RXM4AB2BD	EL1174	ISOLATION RELAY	R4
3	TDS25-BRR	EL1171	SAFETY DISCONNECT SWITCH	SD-1
4	H3Y2	EL1173	24VDC 0-10 SEC RELAY	R6
5	CCT15365	EL1167	TIME SWITCH 24 HR ELECTROMECHANICAL, DIN MNT	TC1
6	TBFR-321N	EL1170	FUSE HOLDER WITH 2A, 10 X 38 MM FUSE	F1
		EL1180	FUSE, 10 X 38MM, 2A	FUSE
7	DMB51CM24	EL1095	CARLO GAVAZZI MULTI-FUNCTION TIMER RELAY	TR1
8	LC1D-09 BD	EL1169	24VDC CONTACTOR	R2
9	LC1D-09 BD	EL1169	24VDC CONTACTOR	R1
10	LC1D-09 BD	EL1169	24VDC CONTACTOR	R3

Installation:

1. Refer to **Figure 4** for typical layout of pit scraper and Auto Pit Scraper Control enclosure.
2. Control enclosure should be mounted in a convenient location and in close proximity to “Pit Scraper Power Unit”.
3. All wiring should be enclosed in NON-METALLIC liquid tight conduit and connector fittings.
4. Route all external wiring into bottom of enclosure where possible to prevent water entering enclosure.
5. Care should be taken when drilling holes into enclosure to prevent damage to wires or other components.
6. Properly ground system including limit switches mounting in pits.



TYPICAL LAYOUT - FIGURE 4



7. **(Figure 5)** illustrates field wiring installation of the HS588-24VDC Auto Pit Scraper Control. REFERENCE DRAWING HS588-24VDC-3
8. External limit switches (Limit #1 and Limit #2) wired "Normally Closed". Switch part# EL1187 spring finger heavy duty IP68 rated limit switch or equivalent should be used.
9. When connecting wire from equipment to terminal clamp, remove no more than ¼" [6.35mm] of insulation from end of wire. Be sure there are no stray wire strands before inserting wire into terminal strip. Insert wire into terminal ¼" [6.35mm] and tighten terminal strip set screw. If screw terminal barrier strip is used, it is recommended to install insulated fork terminal on each wire and insert underneath screw terminal.

INSTALLATION NOTES

24HR TIMER SETTINGS

- 1. CYCLE 1 ON TIME _____
 OFF TIME _____

- 2. CYCLE 2 ON TIME _____
 OFF TIME _____

- 3. CYCLE 3 ON TIME _____
 OFF TIME _____

- 4. CYCLE 4 ON TIME _____
 OFF TIME _____

- 5. CYCLE 5 ON TIME _____
 OFF TIME _____

MAXIMUM RUN TIME SETTINGS

RANGE: _____

TIME: _____

FUNCTION: _____ LD ONLY _____



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This equipment must be installed in accordance with all State and Local Codes and applicable Regulations which should be followed in all cases. Authorities having jurisdiction should be consulted before installations are made.



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Part Number: HSMannual-044
HSART-255 Revision A7
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