

Installation / Operation Manual

Start Key Switch 9iS



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1. Preface

Thank you for purchasing an RS Flight Systems Start Key Switch 9iS. We are pleased that you have chosen our product and are confident that it will meet all your expectations. In case of questions or problems with the unit, feel free to contact us:

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2. System Description

The Start Key Switch 9iS is a starter switch specifically developed for the BRP Rotax iS engines. The switching characteristics offer the same behavior, the same as the ones for the Rotax 912 and 914 engine series. Therefore, the different engine series have an identical starting procedure. The Start Key Switch 9iS includes the control of LANE A and LANE B as well as the Main Fuel Pump and the Auxiliary Fuel Pump. Further, the Engine Management Unit (EMU) and the System Control Unit (SCU) are controlled by the Start Key Switch 9iS. The Start Key Switch 9iS is shown in Figure 2-1.



Figure 2-1: Start Key Switch 9iS

3. Technical Specifications

The technical specifications of the Start Key Switch 9iS are listed in Table 3-1 and the dimensions of the panel cut-out are shown in Figure 3-4.

	Start Key Switch 9iS
Mechanical Dimensions (width, height, depth)	46 x 42 x 120 mm 1.81 x 1.65 x 4.72 in
Panel Cutout Dimensions	Ø 22.4 mm Ø 0.88 in
Mounting Depth excl. Connectors	103 mm 4.06 in
Maximum Panel Thickness	6 mm 0.23 in
Mounting	Included Nut
Total Mass	0.20 kg 0.44 lbs
Maximum Current	20 A
Maximum Voltage	36 VDC
Operating Temperature Range	-20 to +70 °C -4 to +158 °F
Humidity	< 95 %, non-condensing

Table 3-1: Technical specifications

The mechanical dimensions are shown in the drawings in Figure 3-1, Figure 3-2 and Figure 3-3.

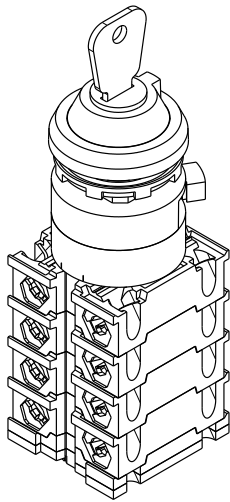


Figure 3-1: SKS 9iS isometric view

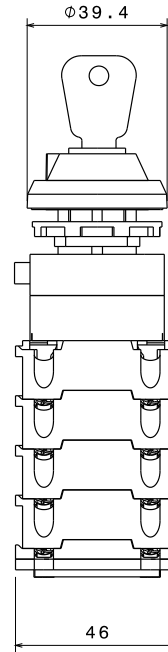


Figure 3-2: SKS 9iS front view

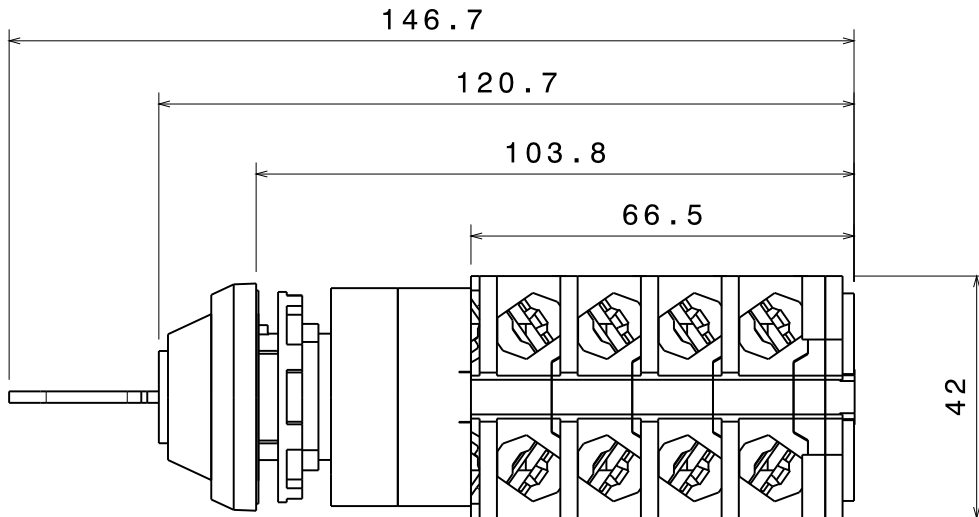


Figure 3-3: SKS9 iS side view [mm]

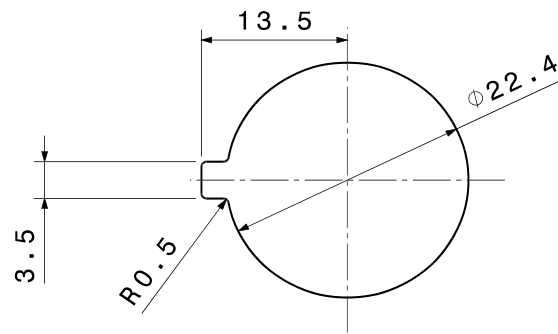


Figure 3-4: Panel Cutout [mm]

4. Operation

This chapter describes operational procedures for the Start Key Switch 9iS.

- In “Off” position, both grounds “Aircraft” and “EMS” are connected to avoid different potentials during refueling and ground handling.
- In “EMU / SCU” position, the EMU / SCU is powered. 1 sec later, the EMU / SCU activates the Start Power Relay and supplies the ECU with power. This position alternatively be used to switch a relay for the main bus.
- In “Lane A” position, the ECU LANE A is activated, and the Main Fuel Pump is supplied with power.
- In “A-B” position, the ECU LANE A and B are activated, and the Main Fuel Pump is supplied with power. Hold this position for at least 5 sec. every time you pass it until the warning LEDs of the ECU are switched off. When using the wiring variant “Double Pump”, the Main Fuel Pump and the AUX Fuel Pump are activated in this position.
- In “Lane B” position, the ECU LANE B is activated, and the Auxiliary Fuel Pump is supplied with power.
- In “Both” positions, the ECU LANE A and B are activated, and the Main Fuel Pump is activated. When using the wiring variant “Double Pump”, the Main Fuel Pump and the AUX Fuel Pump are activated in this position.
- In “Start” position, the starter of the engine is activated. The “Start” position is spring loaded. After starting the engine, maintain in position “Both”. The Start Power Relay is automatically switched off by the EMU / SCU 3 sec. after the engine has reached 1500 rpm.

Regarding the Lane check, please refer to the Operators Manual by Rotax. With the Start Key Switch 9iS, the Lane check is conducted in parallel with the fuel pump check. When passing the position “A-B” during the Lane check, hold this position for at least 5 sec. until the warning lamps are switched off.

5. Electrical Installation

The Start Key Switch 9iS is connected to the Rotax HIC connectors A and B. The detailed pinout is listed in Table 4-1 and shown in the sketch in Figure 5-2.

Two different connection types are possible: The Single Pump variant and the Double Pump variant. In the Single Pump variant, only the Main Fuel Pump is activated in positions “A-B” and “Both”. In the Double Pump variant, both the Main Fuel Pump and the AUX Fuel Pump are activated in positions “A-B” and “Both”.

The legend of the wiring diagram is shown in Figure 5-1.

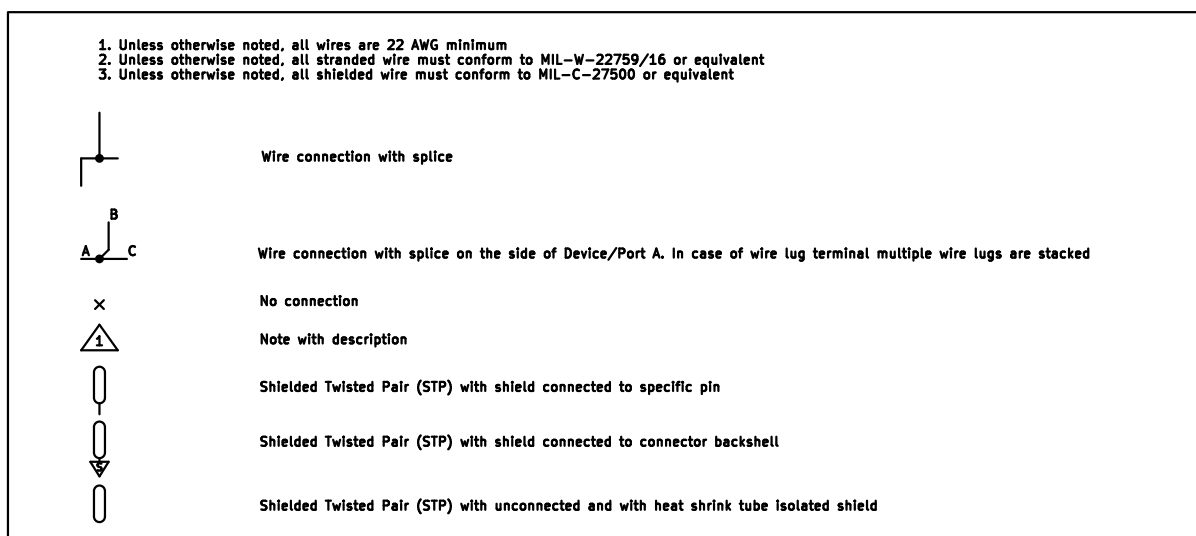


Figure 5-1: Legend of wiring diagram

5.1 Single Pump Variant

This chapter describes the installation variant “Single Pump”. In this variant the AUX Fuel Pump is switched off in the position “A-B” and “Both” and only the Main Fuel Pump is activated in these positions.

Pin Start Key Switch	Connector	Pin	Signal Name	Signal Description	Current / Wire Size
1	HIC A	1	LANE_SEL_SW_A_1	Lane A Supply	AWG 16
2	HIC A	7	LANE_SEL_SW_A_2	Lane A Signal	AWG 16
3	HIC B	1	LANE_SEL_SW_B_1	Lane B Supply	AWG 16
4	HIC B	9	LANE_SEL_SW_B_2	Lane B Signal	AWG 16
5	HIC A	3	SIG_FUEL_PUMP_1	Fuel Pump Main Signal	AWG 18
6	HIC A	9	GND_FUEL_PUMP_1	Fuel Pump Main GND	AWG 18
7	HIC B	3	SIG_FUEL_PUMP_2	Fuel Pump AUX Signal	AWG 18
8	HIC B	11	GND_FUEL_PUMP_2	Fuel Pump AUX GND	AWG 18
9	HIC B	4	CONN_STARTER_REL_SW	Starter GND	AWG 18
10	HIC B	12	SUPP_START_SWITCH	Starter Supply	AWG 18
11	-	-	EMS_GND	EMS GND	AWG 22
12	-	-	AIRCRAFT_GND	Aircraft GND	AWG 22
13	EMU / SCU Lane A	1	PWR	Switched DC Power Supply	AWG 22
14	-	-	Main Bus	DC Power Supply (9-36 VDC)	AWG 22
15	-	-	Reserved	Do not connect	-
16	-	-	Reserved	Do not connect	-

Table 5-1: Start Key Switch 9iS pinout Single Pump Variant

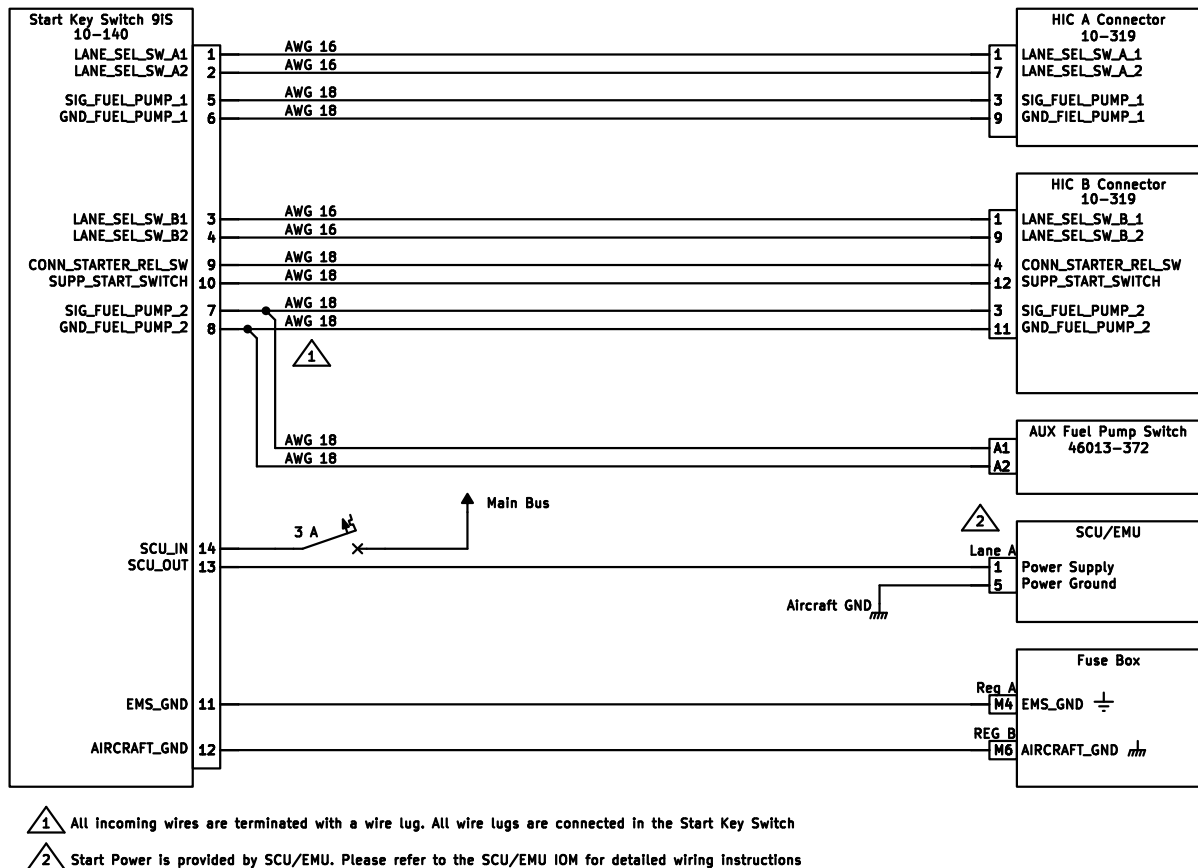


Figure 5-2: Start Key Switch 9iS wiring diagram Single Pump Variant

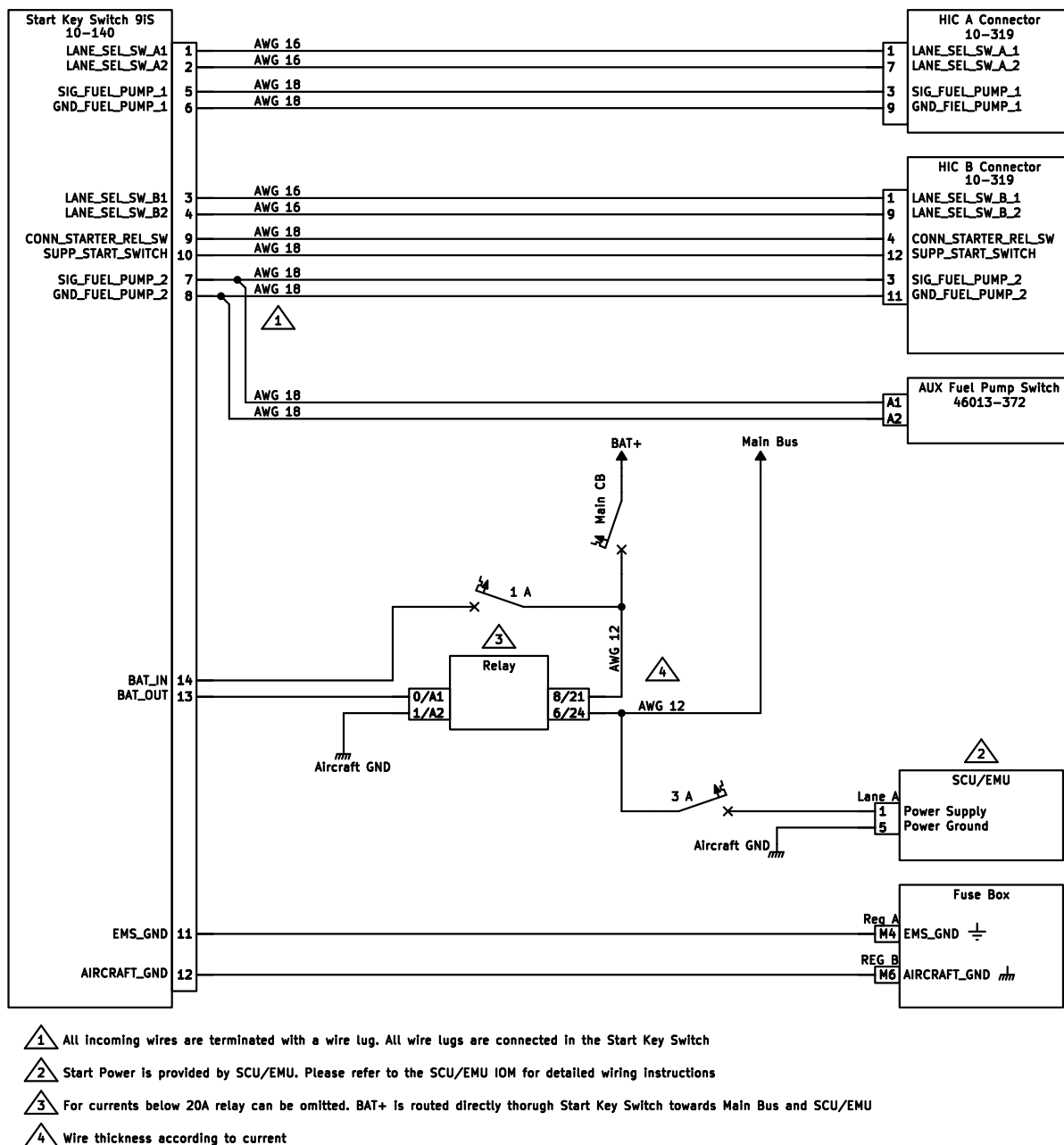


Figure 5-3: Start Key Switch 9iS wiring diagram Single Pump Variant with Master Relay

5.2 Double Pump Variant

This chapter describes the installation variant “Double Pump”. In this variant the AUX Fuel Pump is switched on in the position “A-B” and “Both” and both the Main Fuel Pump and the AUX Fuel Pump are activated in these positions.

Note: The Double Pump Variant is available up from HW Rev. 2.0 (Serial Number SN 0234 and higher)

Pin Start Key Switch	Connector	Pin	Signal Name	Signal Description	Current / Wire Size
1	HIC A	1	LANE_SEL_SW_A_1	Lane A Supply	AWG 16
2	HIC A	7	LANE_SEL_SW_A_2	Lane A Signal	AWG 16
3	HIC B	1	LANE_SEL_SW_B_1	Lane B Supply	AWG 16
4	HIC B	9	LANE_SEL_SW_B_2	Lane B Signal	AWG 16
5	HIC A	3	SIG_FUEL_PUMP_1	Fuel Pump Main Signal	AWG 18
6	HIC A	9	GND_FUEL_PUMP_1	Fuel Pump Main GND	AWG 18
7	-	-	Reserved	Do not connect	-
8	-	-	Reserved	Do not connect	-
9	HIC B	4	CONN_STARTER_REL_SW	Starter GND	AWG 18
10	HIC B	12	SUPP_START_SWITCH	Starter Supply	AWG 18
11	-	-	EMS_GND	EMS GND	AWG 22
12	-	-	AIRCRAFT_GND	Aircraft GND	AWG 22
13	EMU / SCU Lane A	1	PWR	Switched DC Power Supply	AWG 22
14	-	-	Main Bus	DC Power Supply (9-36 VDC)	AWG 22
15	HIC B	3	SIG_FUEL_PUMP_2	Fuel Pump AUX Signal	AWG 18
16	HIC B	11	GND_FUEL_PUMP_2	Fuel Pump AUX GND	AWG 18

Table 5-2: Start Key Switch 9iS pinout Double Pump Variant

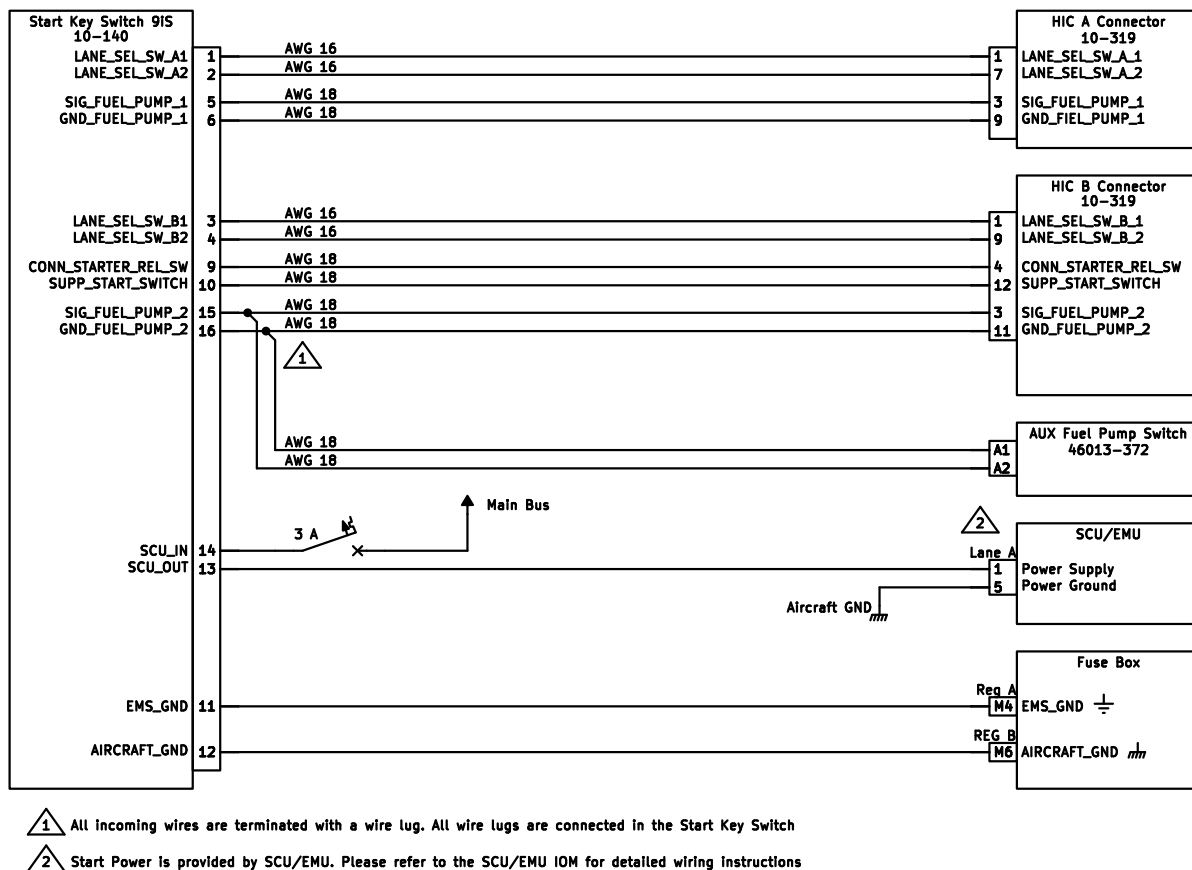


Figure 5-4: Start Key Switch 9iS wiring diagram Double Pump Variant

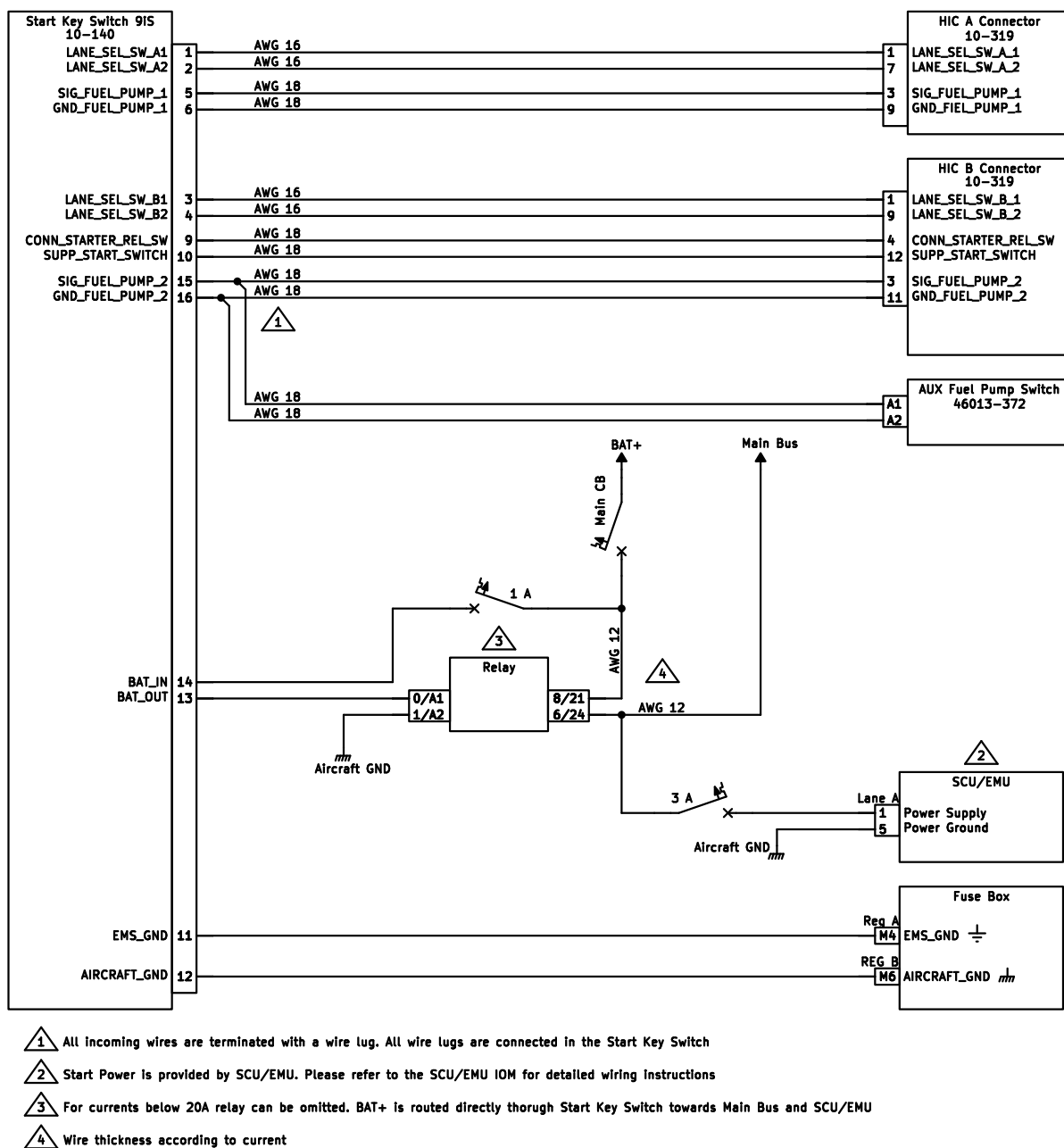


Figure 5-5: Start Key Switch 9iS wiring diagram Double Pump Variant with Master Relay

5.3 Switching Logic

The switching logic is listed in following tables. “On” means that the corresponding pin numbers are electrically conductive. “-” means that the corresponding pin numbers are electrically non-conductive. In Table 5-3 the hardware revision 1.0 is shown and in Table 5-4 the hardware revision 2.0.

Note: serial numbers SN 0001 to 0233 are hardware revision 1.0. Serial numbers SN 0234 and higher are hardware revision 2.0.

	Name	LANE A	LANE B	Fuel Pump Main (Single pump)	Fuel Pump AUX	Starter	GND	PWR EMU/SCU	Reserved
Name	Position Pin	1/2	3/4	5/6	7/8	9/10	11/12	13/14	15/16
Off EMU / SCU Lane A A-B Lane B Both Start	0°	-	-	-	-	-	On	-	-
	60°	-	-	-	-	-	-	On	-
	120°	On	-	On	-	-	-	On	-
	180°	On	On	On	-	-	-	On	-
	240°	-	On	-	On	-	-	On	-
	300°	On	On	On	-	-	-	On	-
	330°	On	On	On	-	On	-	On	-

Table 5-3: Start Key Switch 9iS switching arrangement HW Rev. 1.0

	Name	LANE A	LANE B	Fuel Pump Main (Single pump)	Fuel Pump AUX	Starter	GND	PWR EMU/SCU	Fuel Pump AUX (Both Pumps)
Name	Position	1/2	3/4	5/6	7/8	9/10	11/12	13/14	15/16
	Pin								
Off	0°	-	-	-	-	-	On	-	-
EMU / SCU	60°	-	-	-	-	-	-	On	-
Lane A	120°	On	-	On	-	-	-	On	-
A-B	180°	On	On	On	-	-	-	On	On
Lane B	240°	-	On	-	On	-	-	On	On
Both	300°	On	On	On	-	-	-	On	On
Start	330°	On	On	On	-	On	-	On	On

Table 5-4: Start Key Switch 9iS switching arrangement HW Rev. 2.0

6. Accessories

6.1 Front Plate for EMU

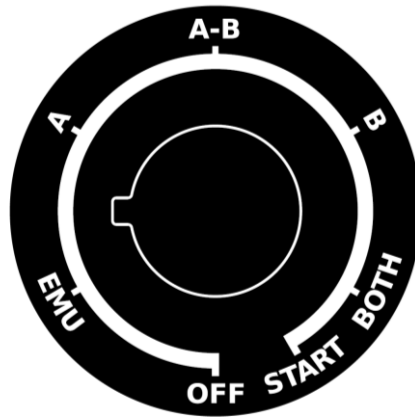


Figure 6-1: Front Plate for EMU

The optional front plate with indications for the switching positions is shown in Figure 6-1.



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