UltraSync-E

User Guide

HUSKY®

Keeping our customers in the lead

Original Instructions

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This product manual is intended to provide information for safe operation and/or maintenance. Husky reserves the right to make changes to products in an effort to continually improve the product features and/or performance. These changes may result in different and/or additional safety measures that are communicated to customers through bulletins as changes occur.

General Information

Telephone Support Numbers

North America	**Toll free**	1-800-465-HUSKY (4875)
Europe	**EC (most countries)**	008000 800 4300
	Direct and Non-EC	+ (352) 52115-4300
Asia	**Toll Free**	800-820-1667 or +800-4875-9477
	Direct:	+86-21-3849-4520
Latin America	**Brazil**	+55-11-4589-7200
	Mexico	+52-5550891160 option 5

For on-site service, contact the nearest Husky Regional Service and Sales office.

For non-emergency questions and issues, e-mail Husky at techsupport@husky.ca.

Husky Regional Service and Sales Offices

For the nearest location, please visit www.husky.co.

Product Upgrades

Upgrades are available that can improve output, reduce cycle times, and add functionality to Husky equipment.

To see what upgrades are available, visit www.husky.co or call the nearest Husky Regional Service and Sales Office.

Ordering Spare Parts

All spare parts for Husky equipment can be ordered through the nearest Husky Parts Distribution Center or online at www.husky.co.

Ordering Additional Manuals

Additional copies of this manual and other documentation can be purchased through the nearest Husky Regional Service and Sales office.

Table of Contents

Chapter 1 Introduction

This user guide contains the instructions for the safe installation, operation, and maintenance of the Altanium UltraSync-E (Electric) controller. It has the necessary information to connect the UltraSync-E to an Injection Molding Machine (IMM).

Information to test hot runners with the UltraSync-E before the hot runners are installed on an IMM is also given.

NOTE: The UltraSync-E can operate on Altanium Delta5 and Matrix5 controller systems. The screens shown in this user guide are for the Delta5 controller system. The operation of the UltraSync-E is the same for the two controller systems.

IMPORTANT!

Some manuals may contain addendums that detail new or updated information. Before reading a manual, make sure to review all available addendums located at the end of the manual.

1.1 General Safety

WARNING!

Electrical shock risk - de-energize controller prior to connecting, disconnecting or servicing the controller, hot runner or mold.

WARNING!

Electrical hazard - risk of shock or personal injury. ALWAYS ensure the screw on the back of the top portion of the controller, marked with the general warning symbol, is installed when controller is energized. This is the grounding point for the top cover to the chassis. Removal of this screw could cause an unsafe condition unless proper precautions are taken such, as Lock Out Tag Out (LOTO).

WARNING!

Gas/vapor hazard - risk of respiratory injury. Certain processed materials could release harmful gas, vapors or dust. Install an exhaust system according to local codes. Plastic degrades with prolonged exposure to the setpoint temperature. Do not leave machine and controller unattended.

Obey the general safety guidelines that follow:

- The system should only be installed by qualified personnel in accordance with local codes.
- The safety of any system incorporating this equipment is the responsibility of the assembler of the system.
- Only persons with a thorough knowledge of the system's operation and capabilities should operate the system.
- Read all of these instructions before connecting power and turning on the system.
- Follow all warnings and instructions marked on the system.
- Unless specifically explained in this manual or directed by Husky, do not attempt to repair the system. Doing so could result in damage to the system, or serious personal injury.
- Only use the specified input supply voltage that is indicated on the identification label attached to the power input cable and/or the cabinet

  NOTE: If unsure of the appropriate supply voltage, call the nearest Husky Regional Service and Sales office.

CAUTION!

Mechanical hazard - risk of damage to the equipment. NEVER allow the fan inlets or outlets on the unit to become blocked. This is where the system's cooling airflow enters and exits. If this area of the mainframe becomes cluttered and insufficient airflow results, damage may occur to the system.

CAUTION!

When switching OFF the system wait 30 seconds before switching the main disconnect back ON. Failure to wait 30 seconds may result in communication issues.

1.1.1 Safety Signs

Safety signs clearly mark potentially hazardous areas in or around equipment. For the safety of personnel involved in equipment installation, operation, and maintenance, use the guidelines that follow:

The safety symbols that follow may appear on safety signs:

NOTE: Safety signs may include a detailed explanation of the potential hazard and associated consequences.

Safety Symbol	General Description of Symbol
	**General** This symbol indicates a potential personal injury hazard. It is usually accompanied by another pictogram or text to describe the hazard.
	**Hazardous Voltage** This symbol indicates a potential hazard that may cause death or serious injury and will appear on any panel that, if removed, will expose the user to more than 40 VAC.

1.2 Purpose of the Equipment

The Altanium UltraSync-E controller is used to electrically control the movement of the valve stems of a Husky UltraSync-E hot runner. The UltraSync-E controller can have an optional temperature control function.

Contact your nearest Husky Regional Service and Sales office if you plan to use a Husky product for anything other than its intended use.

1.3 Restrictions of Use

Husky injection molding equipment must never be:

- used for any purpose other than that described in Section 1.2, unless otherwise approved by Husky
- operated or serviced by personnel unfamiliar with the inherent risks and necessary precautions related to controllers

1.4 Input Wiring (Conventional)

The table that follows summarizes the wiring conventions used.

Description	Wire Color	
Neutral	Blue	
Earth/Ground	Green/Yellow	Green
Line	Black	Black
Line	Brown	Red
Line	Gray	White

DANGER!

Electrocution and/or mechanical hazard - risk of death or serious injury and possible damage to the equipment.

Incorrectly wiring the controller could cause death or serious injury and/or damage to the controller or hot runner. Only qualified personnel should connect the electrical power supply. All work must conform to applicable local electrical codes.

1.5 Environmental Operating Specification

The list that follows shows the environmental operation specifications for the operator interface:

CAUTION!

Mechanical hazard – risk of equipment damage. Falling or spraying liquid, including oil or water, could damage the equipment. Do not spray wash.

- For Indoor use only
- Operating Temperature: 5 to 40 °C (41 to 104 °F)
- Operating Humidity: 0% to 90% RH, Non-Condensing
- Altitude: up to 2000 m (6562 ft)
- Pollution Degree: PD3
- Overvoltage Category: OVIII

1.6 Equipment Ratings

Ratings for the entire Altanium Controller can be found on the nameplate attached to the back of the controller.

The following are the equipment ratings for the Altanium Delta5/Matrix5 operator interfaces:

- Supply Voltage: 100 to 240 VAC ± 10%, single phase
- Frequency: 47 to 63 Hz
- Power Rating: 130 W (typical)

1.7 Technical Specifications

The dimensions and weight of the controller can change based on the controller configuration.

The following are the technical specifications for the Altanium Delta5 operator interface only:

- Width: 330 mm (13 in)
- Height: 380 mm (15 in)
- Depth: 280 mm (11 in)
- Weight: 6.8 kg (15 lb)

The following are the technical specifications for the Altanium Matrix5 operator interface only:

- Width: 430 mm (13 in)
- Height: 420 mm (16.5 in)
- Depth: 380 mm (15 in)
- Weight: 17.9 kg (39.5 lb)

Chapter 2 Integration

This chapter contains the instructions for the safe installation of the Altanium UltraSync-E. It also contains the necessary information to connect the UltraSync-E to an injection molding machine (IMM).

Also, the chapter contains the necessary information to test molds with the UltraSync-E before the molds are installed on an IMM.

2.1 Limitations of This Manual

This chapter is for engineers and/or technicians who are responsible for the installation of the UltraSync-E and the interface between the UltraSync-E and the IMM. This person/function will be referred to as the system integrator in the pages that follow.

The system integrator must do the tasks that follow:

- Connect all of the equipment of the injection molding cell.
- Install all the equipment safely in accordance with all industry, regulatory and local safety standards. Refer to Section 2.2 for a list of directives and standards. There may be other applicable directives and standards. The system integrator must make sure that all applicable directives and standards are obeyed.
- Know the molding cell fully, so that there are no dangerous procedures, installations, or connections.

The system integrator must be supplied by the end user. Husky does not know all the necessary information for each customer and each molding cell.

This chapter does not supply information on how to do risk identification, risk assessments, or other analysis. The system integrator must do these tasks.

2.2 Reference Directive and Standards

This is a list of typical directives and standards for this type of equipment and all may not apply or may not apply in their entirety. There may be other applicable directives and standards not listed.

NFPA79	Electrical Standard for Industrial Machinery
UL508A	Standard for Industrial Control Panels
2006/42/EC	European Machinery Directive and Amendments Article 12.2 ANNEX VIII

2014/35/EU	European Low Voltage Directive
2014/30/EU	European Electromagnetic Compatibility Directive - Article 7 ANNEX II
EN12100	Safety of machinery - Basic concepts, general principles for design
EN60204-1	Safety of machinery - Electrical equipment of machines
EN201	Plastics and rubber machines - Injection molding machines - Safety requirements
EN61000	Electromagnetic Compatibility

2.3 Safety

Refer to Section 1.1 for information on warnings, cautions, and notes that are used in this manual, and the safety symbols found on the UltraSync-E.

Refer to Section 2.10 for lockout/tagout procedures.

2.4 UltraSync-E Controls, Connectors, and Parts Identification

Figure 2-1 shows the UltraSync-E and the location of the controls, connectors, and other parts on the UltraSync-E.

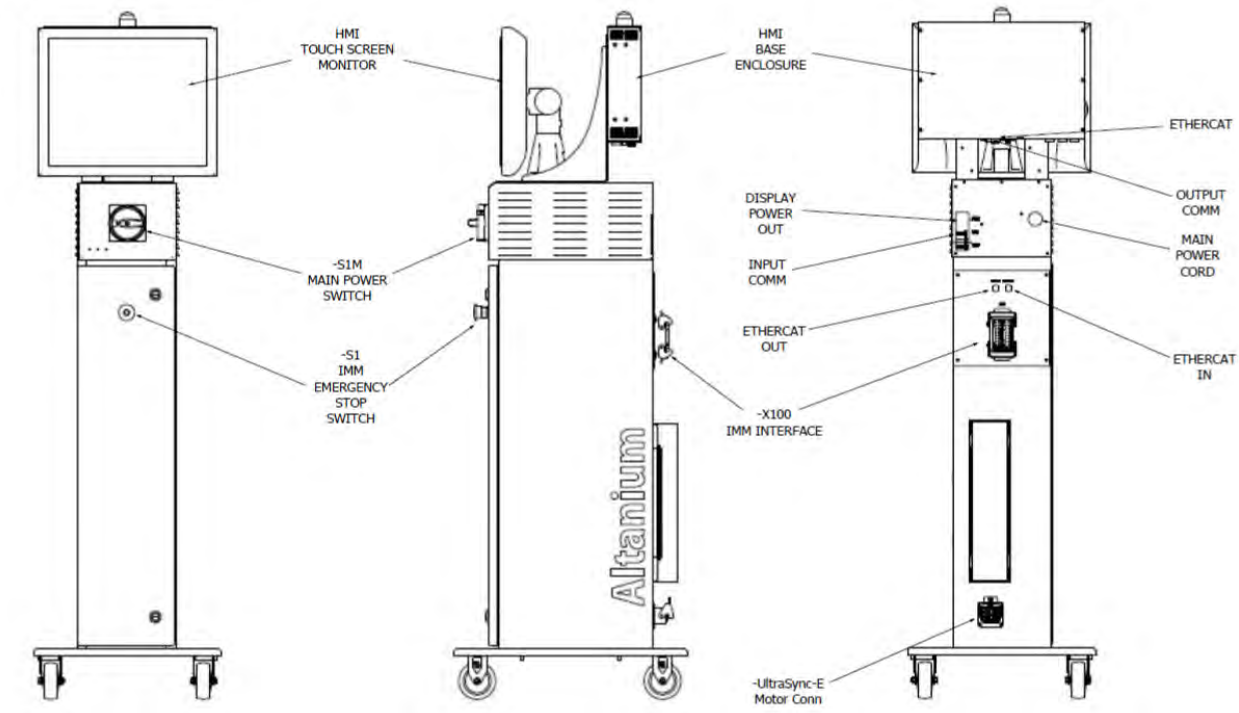


Figure 2-1 UltraSync-E Controls, Connectors, and Parts Identification

2.5 Initial Setup of the UltraSync-E

2.5.1 Remove the UltraSync-E from the Shipping Container

WARNING!

Only qualified, certified and trained personnel are permitted to remove the UltraSync-E from the shipping container and pallet. Injury to personnel and /or damage to the UltraSync-E can occur if you do not use the correct procedures.

a. Remove the crating material to get access to the UltraSync-E and pallet.

b. Remove the straps that attach the UltraSync-E to the pallet.

c. Remove the material that stops the movement of the wheels.

d. Lift the UltraSync-E from the pallet. Refer to Section 2.5.2.

e. After you have put the UltraSync-E on a hard surface, the wheels of the UltraSync-E will let you push the UltraSync-E in position.

2.5.2 Lift the UltraSync-E

2.5.2.1 General

WARNING!

Only qualified, certified and trained personnel are permitted to lift the UltraSync-E. Injury to personnel and /or damage to the UltraSync-E can occur if you do not use the correct lifting procedures.

The UltraSync-E has three configurations:

- Single stack
- Double stack
- Triple stack

Each of the three configurations needs webbed straps and ratchet straps of different lengths to lift them. Refer to Table 2-1.

Table 2-1 Controller Lifting Information

Altanium Controllers	Webbed Straps Rated 2903kg (6400lb)	Ratchet Strap	Lifting Device (Lift Capacity)
Single Stack	2.44 m x 25.4 mm (8 ft x 1 in) – Quantity (2)	1.52 m (5 ft) – Quantity (1)	227 kg (500 lb)
Double Stack	3.66 m x 25.4 mm (12 ft x 1 in) – Quantity (2)	1.83 m (6 ft) – Quantity (1)	454 kg (1000 lb)
Triple Stack	3.66 m x 25.4 mm (12 ft x 1 in) – Quantity (2)	2.44 m (8 ft) – Quantity (1)	907 kg (2000 lb)

Each of the three configurations needs a crane or other applicable lifting device with a different load rating. Refer to Table 2-1.

2.5.2.2 Lifting Procedures

1. Place each of the webbed straps under the controller. See the table for the correct strap lengths:
   - For a single stack UltraSync-E, put the two webbed straps in position below the UltraSync-E from left to right.
   - For a double or triple stack UltraSync-E, put the two webbed straps in position below the UltraSync-E from front to rear.

2. Bring the straps up and above the UltraSync-E controller and attach them to the lifting device. Refer to Figure 2-2.

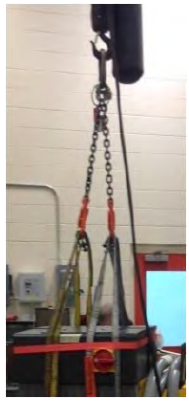


Figure 2-2 Straps and Lifting Device

3. Make sure that the webbed straps go between the caster wheel and the retaining bracket. Refer to Figure 2-3.

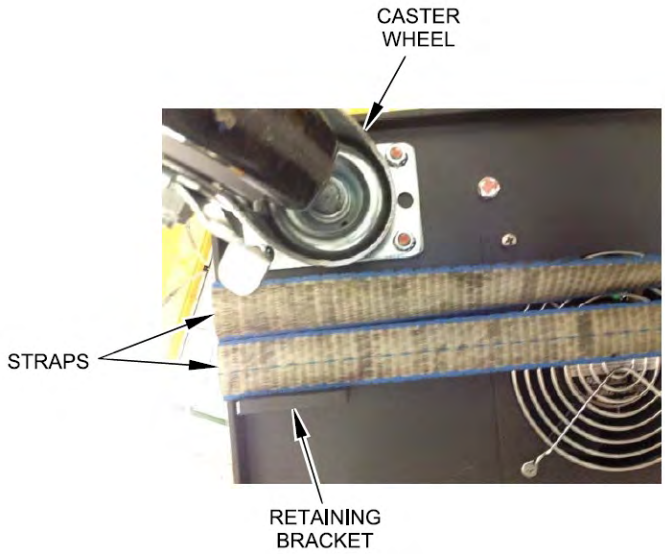


Figure 2-3 Straps - Correct Position

4. Make sure that no UltraSync-E cables are caught between the UltraSync-E cabinet and the webbed straps. Refer to Figure 2-4.

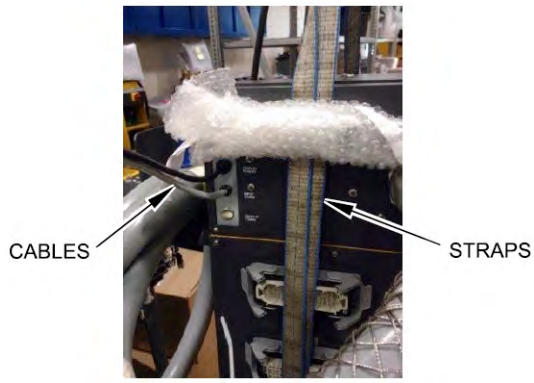


Figure 2-4 Cable Check

5. With the lifting device, use only the force necessary to apply tension to the webbed straps. Do not lift the UltraSync-E stack at this time.
6. Put the ratchet strap around the top of the UltraSync-E stack and over the webbed straps. Do not tighten the ratchet strap at this time.

   NOTE: The ratchet strap prevents the UltraSync-E stack from tilting when you lift the UltraSync-E.
7. The ratchet strap can cause damage to the surface of the UltraSync-E cabinet. Put applicable protective material in all areas to prevent damage to the surface of the UltraSync-E cabinet. Refer to Figure 2-5.

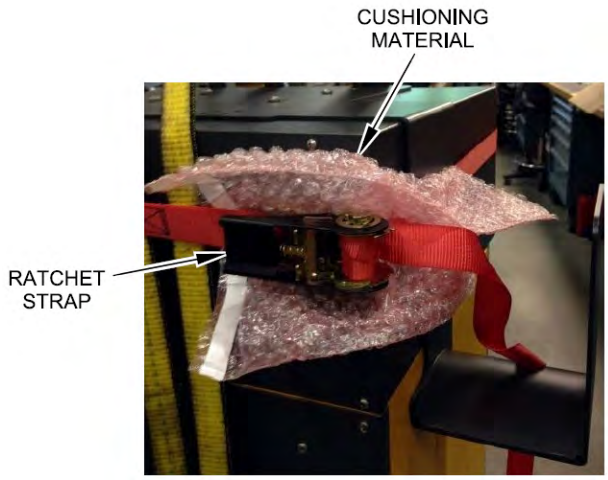


Figure 2-5 Cushioning Material

8. Tighten the ratchet strap.
9. With the lifting device, carefully and slowly lift the UltraSync-E stack 1 to 3 inches (25.4 to 76.2 mm).

10. Examine the webbed straps and ratchet strap to make sure that the UltraSync-E stack will not tilt.
11. Move the UltraSync-E stack to the correct location.
12. Carefully and slowly lower the UltraSync-E stack. Continue to lower the UltraSync-E stack until there is no tension in the webbed straps.
13. Remove the ratchet strap, the protective material, and the webbed straps.

2.6 Assemble the UltraSync-E

Do the steps that follow to install the display module on the UltraSync-E stack.

NOTE: The display module comes in a different protective box.

1. With the front of the UltraSync-E in front of you, remove the four M6 x 1mm button head cap screws from the top of the UltraSync-E stack.
2. Put the display module on top of the UltraSync-E and align the display module holes with the holes in the top of the UltraSync-E stack.
3. With the supplied 4mm hex wrench, install and tighten the four button head cap screws. Refer to Figure 2-6.

Figure 2-6 Display Module - Attachment

4. On the rear of the UltraSync-E stack, connect the display power, EtherCAT, and Input Comm (temperature control models only) cables from the display module to the UltraSync-E stack.

   NOTE: The display module receives power from the display power connection on the rear of the UltraSync-E stack only.

WARNING!

Risk of electrical shock or electrocution.

Connect the input power of the UltraSync-E correctly. Not correctly connecting the input power could cause death or serious injury to personnel and/or damage to the UltraSync-E or IMM. Only approved personnel should connect the input power. All applicable local electrical codes must be obeyed.

2.7 Connect the Input Power

1. Connect the UltraSync-E to the correct power supply. The attached nameplate or supplied schematic will show what power supply configuration the UltraSync-E has.

   NOTE: The UltraSync-E is manufactured to receive main supply power in two ways:
   • 400 Vac +/- 10%, 3-phase + neutral + ground (WYE), 50/60 Hz
   • 240 Vac +/- 10%, 3-phase + ground (DELTA), 50/60 Hz.

   Because each UltraSync-E is different, see the controller nameplate or electrical schematics for the maximum current ratings.

2. Contact Husky customer support if it is necessary to change the power supply configuration.

2.8 Overcurrent Protective Device

The UltraSync-E has a main power switch on the front of the cabinet. Refer to Figure 2-1.

The UltraSync-E does not have an input power overcurrent protective device.

To obey the electromagnetic compatibility directive, EMI/RFI filters are installed in the UltraSync-E. The leakage current range is 10 to 100 milliamps (mA).

The system integrator must supply and install the correct overcurrent protective device.

The size and rating of the overcurrent protective device must:

- Agree with the input power of the UltraSync-E. Refer to Section 2.7.
- Align with the leakage current
- Have a short circuit breaking capacity not less than fault current at the point of installation.

The overcurrent protective device must supply protection to indirect contact by automatic disconnection of the input power. It also must be applicable to the distribution system (TN/TT/IT).

You must do tests to make sure that the conditions for automatic disconnection of the input power occurs. The conditions are:

- A test of the continuity of the protective bonding circuit is done at the factory. The bonding circuit is between the PE conductor and applicable points of the bonding circuit.
- You must calculate or measure the fault loop impedance.
- You must make sure that the set points and characteristics of the overcurrent protective device obey all the local codes.

2.9 Bonding

The system integrator must make sure that the UltraSync-E and the mechanical component of the axes that it controls is correctly bonded (electrically).

The system integrator must know the distribution system type (TN/TT/IT). As an example, the correct length and cross-sectional area of the conductor that will supply the electrical bonding will change for a TN, TT, or IT system.

2.10 Lockout/Tagout Procedures

If you do maintenance on the UltraSync-E, you must do lockout/tagout procedures.

Use the main power switch on the UltraSync-E cabinet to de-energize the UltraSync-E and the IMM. Refer to Figure 2-1.

You must do lockout/tagout procedures on all the equipment in the mold area (UltraSync-E, IMM, etc.).

Lockout/tagout includes the steps that follow.

NOTE: The list of steps that follows does not include all of the lockout/tagout steps that you may need to do.

1. De-energize all systems.
2. Discharge all stored electrical energy.
3. Isolate all energy sources.
4. Apply locks and tags to all energy sources.
5. Install a placard at all the isolation points.
6. Block off the molding cell area.
7. If you must troubleshoot with power applied, then you must have another person with you. Also emergency medical assistance should be available.

Usually each location will have written lockout/tagout procedures. These procedures will include all local codes. You must obey these procedures. Also, each location will have special personnel that do lockout/tagout procedures.

2.11 Connecting the Controller

To connect the controller to the IMM, do the steps that follow:

IMPORTANT!

Only qualified personnel should be permitted to make modifications to the machine interface.

1. Connect the supplied X100 interface cable to the X100 connector on the controller. Refer to Figure 2-1 for the X100 connector location.

   Refer to Section 2.12 for information about signals.

CAUTION!

Electrical hazard – risk of damage to the controller. All signals sent to the controller must be from dry or potential-free contacts.

2. Use the electrical schematics for the controller and the IMM to connect the X100 cable to the IMM. Refer to Chapter 4. Some modifications to the IMM may be required to connect the cables to the appropriate signal source or destination. Contact the nearest Husky Regional Service and Sales office for assistance.

2.12 Input/Output Signals and Other Connections

On the back of the UltraSync-E are the connections for the input/output (I/O) signals, UltraSync-E servo motor, and EtherCAT.

2.12.1 Input/Output Signals

An X100 interface connection is used to send input/output (I/O) signals between the UltraSync-E and the injection molding machine (IMM).

The connector location is on the back of the UltraSync-E. Refer to Figure 2-1.

2.12.2 X100 Connection

The +P0-X100 IMM interface connector is used for operation and safety-related signals. Refer to Figure 2-7 for an illustration of the connector.

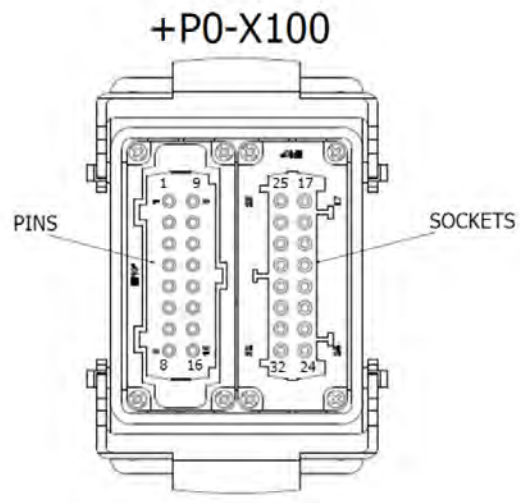


Figure 2-7 +P0-X100 IMM Interface Connector

An interface cable (-W-X100) is supplied with the UltraSync-E controller. The interface cable connects the UltraSync-E controller to the IMM.

Husky uses a Harting HAN 32B connector for the interface connector.

The interface cable has no connector at the end that attaches to the IMM. The system integrator must attach the cable leads to the IMM connectors. The system integrator must refer to the IMM electrical schematics and the UltraSync-E signal/pin descriptions to see how to connect the cable leads on the IMM connectors. The cable leads can also be hard wired directly to the IMM control cabinet.

As an aid, each cable wire is numbered along its length. The wire numbers are the same as the pin numbers on the X100 cable connector. This helps identify the wires when they are connected the IMM.

Optional customer-specified cable connectors are also possible. Husky can supply cables with installed connectors and specified pin locations that the customer wants for the IMM side or even the controller side.

NOTE: The signals from the X100 I/O system do not change, but the cable connectors and pin locations can be adapted.

Table 2-2 gives the descriptions for X100 signals and their related pin locations.

Table 2-2 +P0-X100 Connector Pin Descriptions

Signal Name	Safety	Operation	Description	+P0-X100 Pin
E-Stop Push Button of Controller Ch1	X		Emergency stop button on the controller. OPEN when the controller emergency stop button is operated (pushed) and causes an emergency stop of the IMM.	1,2
E-Stop Push Button of Controller Ch2	X		Emergency stop button on the controller. OPEN when the controller emergency stop button is operated (pushed) and causes an emergency stop of the IMM.	3,4
Handling Device		X	This signal is required when a EUROMAP 67 (EM67) or EUROMAP 12 (EM12) communication interface is used. The UltraSync-E operates as a "disengaged robot" to the IMM, if an EM67 is connect to the IMM. At a HIGH level, the part handling device is not engaged, thus the IMM does not need any other EM67 signals (for example, Permit Mold Close, Ejector forward/back). This signal is hardwired CLOSED (to pin 6) and not connected to any relay output.	5
24VDC From IMM		X	Reference HIGH level from the IMM, for relay outputs from the controller.	6
Fault Stop Immediate (Isolated Contact)		X	This isolated contact is opened when an immediate stop is required for the IMM, due to fault or alarm on the controller. This signal can be used to provide clamp motion permission to the IMM.	7,8
UltraSync-E Ready and Engaged		X	Active when controller is enabled with no faults, in auto/engaged mode.	9 (6)
UltraSync-E Stems at Open		X	Active when all of the following conditions are true: • Valve gate controller is ready and engaged • Valve stems are at open position • Valve gate controller is in auto/engaged mode This signal can be used to provide injection permission to the IMM.	10 (6)
UltraSync-E Stems at Close		X	Active when valve gate stems are at closed position, and controller is enabled.	11 (6)
Reserved		X	Reserved. Do not connect to this pin.	12
Configurable Output 5		X	Software-configurable output.	13 (6)
Configurable Output 6		X	Software-configurable output.	14 (6)

Table 2-2 +P0-X100 Connector Pin Descriptions (Continued)

Signal Name	Safety	Operation	Description	+P0-X100 Pin
Configurable Output 7		X	Software-configurable output.	15 (6)
No connection		X	No connection.	16 (6)
IMM Safety Gate Ch1	X		IMM safety gate contacts must be CLOSED for the plastic injection to operate. The signal must be the result of a series of mold area safety gate contacts (refer to EN 201: Safety of Plastics Molding Machines). The signal must be isolated from all other signals. This signal is necessary for operation.	17,18
E-Stop of IMM Ch1	X		The switch contact will OPEN when the IMM emergency stop device is operated. An OPEN safety device/switch causes an emergency stop of all IMM movement. The signal must be isolated from all other signals. This signal is necessary for operation.	19,20
24VDC of Controller		X	Reference HIGH level from the UltraSync-E, for relay outputs from the IMM. This signal is necessary for operation.	21
IMM in Auto		X	Active when IMM is cycling in Automatic. Signal is used to prevent valve gate servo controller from being put into manual or disabled mode. This signal is optional.	22 (21)
External At Temperature		X	Active when all heat zones are within their defined tolerance range. This is used to trigger a soak timer, which when complete enables the operation of the valve stems. This signal is necessary for operation when not integrated with a heat controller.	23 (21)
UltraSync-E Stems Open Command		X	Command to open valve gates when controller is in engaged/auto mode. This signal is necessary for operation.	24 (21)
UltraSync-E Stems Close Command		X	Command to close valve gates when controller is in engaged/auto mode. This signal is necessary for operation if a Two Trigger system is used.	25 (21)
External Permit Calibration		X	Active when valve gate calibration is permitted. This signal is optional.	26 (21)

Table 2-2 +P0-X100 Connector Pin Descriptions (Continued)

Signal Name	Safety	Operation	Description	+P0-X100 Pin
Configurable Input 6		X	Other digital input to be used when necessary. This signal is optional.	27 (21)
Configurable Input 7		X	Other digital input to be used when necessary. This signal is optional.	28 (21)
Configurable Input 8		X	Other digital input to be used when necessary. This signal is optional.	29 (21)
Configurable Input 9		X	Other digital input to be used when necessary. This signal is optional.	30 (21)
Configurable Input 10		X	Other digital input to be used when necessary. This signal is optional.	31 (21)
0VDC of Controller		X	A reference of pin 25 from the UltraSync-E for test functions. Also used for sourced digital outputs from the IMM, if necessary.	32

2.12.3 Safety Signals

All control panels on an IMM must have an emergency stop (E-STOP) push button. There is an E-STOP push button on the front of the UltraSync-E (refer to Figure 2-8). Its function is to operate as part of the IMM E-Stop circuit. The UltraSync-E E-STOP push button has two isolated, normally closed, signal channels that attach to the X100 connector pins 1/2 (channel 1) and pins 3/4 (channel 2). (Refer to Table 2-1 for X100 pin locations, or refer to the electrical schematic if the UltraSync-E has a customer-specified IMM interface.) The E-STOP push button is monitored in the UltraSync-E software and causes an alarm on the Human Machine Interface (HMI) screen when pushed.

Figure 2-8 Emergency Stop Push Button

If the controller is used in a bench mode operation, then the E-STOP push button is connected to the UltraSync-E E-STOP circuit. Isolated from the IMM, the E-STOP button causes an emergency stop of the UltraSync-E when pushed. For bench mode operation, a bench mode plug is installed in the X100 connector.

Figure 2-9 Bench Mode Plug

There are two safety signals the IMM must supply to the UltraSync-E:

- E-STOP - The signal is sent by the IMM when:
  - The UltraSync-E E-STOP push button is operated, or
  - A different E-STOP within the molding cell is operated
- Safety Gates Open - The signal is sent by the IMM when the mold area safety gates are opened.

The E-STOP and safety gate signals are connected to two isolated channels and safety relays (-K1 and -K2) in the UltraSync-E from the X100 connector (refer to Table 2-1 or the electrical schematic for descriptions). These signals must be in a usually closed circuit condition (a non-safe condition, during machine operation). During a safety circuit fault (open circuit, broken wire, cable disconnected) the system defaults to the safe condition (no IMM movement).

For any UltraSync-E valve stem movement to occur the following must be true:

- On integrated systems:
  - Temperature control must be running
  - Temperature control must be At Temperature
  - Soak timer must have completed
  - UltraSync-E must be enabled and calibrated
- On systems with external temperature control:
  - External At Temperature signal must be active
  - Soak timer must have completed
  - UltraSync-E must be enabled and calibrated

When a safety signal is operated (the circuit becomes open), it causes the circuit safety relay to open. This signals the valve stems to move to the closed position, so no plastic drooling occurs. Motor movement is then stopped.

The safety relays have contacts that release immediately and contacts that are time-released. The contacts that release immediately let the control logic know that there is an E-STOP or safety-gates-open condition. The servo system has a Safe Torque Off (STO) safety integration function that starts when the time-released contacts open. The STO function stops the control of the servo system power unit and prevents any possible dangerous axis movement.

The time-released contacts are set to 0.6 seconds to give sufficient time for the valve stems to reach the closed position. This is so plastic drooling does not occur before the STO function is enabled, which prevents possible dangerous motion.

A check of the 0.6 second set time is done by the controller logic each time the safety relay is operated. The UltraSync-E screen shows an alarm if the time is not set correctly. The 0.6 second time check cannot be changed.

The system integrator must make sure that the 0.6 seconds is less than the access time to any possible dangerous movement. More safety devices or gates between the operator and the mold area may be necessary.

2.13 EtherCAT Connections

The EtherCAT In/Out connector locations are on the back of the controller, above the X100 connectors (refer to Figure 2-10). The operator interface display module connects to the EtherCAT In connector. EtherCAT Out is used to connect other Altanium devices.

Figure 2-10 EtherCAT Connections

2.14 UltraSync-E Servo Motor Connection

The connector location for the UltraSync-E servo motor cable is on the back and bottom of the controller cabinet (refer to Figure 2-1).

2.15 Display Power and Temperature Control Connections

The power connection cable for the operator interface display module is on the back of the controller, at the top left (refer to Figure 2-11). The input comm port is used if the mainframe controls hot runner mold process temperatures. The output comm port is used to link to another Altanium mainframe for added temperature controls.

Figure 2-11 Display Power and Temperature Control Connections

2.16 Start the UltraSync-E

2.16.1 Before You Apply Power

1. Make sure the wheels of the UltraSync-E are locked, so that the controller cannot move.

CAUTION!

If applicable to your system, make sure that there is no blockage of the air filter cover or the air outlets. If there is not sufficient airflow then damage can occur to the UltraSync-E.

2. If applicable to your system, make sure that there is no blockage of the air filter cover on the rear of the UltraSync-E. Remove all materials around the air filter cover, so that there is good airflow into the air filter.
3. Make sure that the cable routing is along smooth surfaces and not sharp edges. Make sure that personnel cannot trip on the cables. Use applicable cable tracks where necessary.
4. For cable routing that has no movement, make sure that the bend radius of the cable is not less than four times the diameter of the cable.
5. For cable routing that has continuous movement, make sure that the bend radius of the cable is not less than 7.5 times the diameter of the cable.
6. Make sure that the cables are connected correctly and are not loose.
7. Make sure that the ground wire is connected correctly between the UltraSync-E and the electrical power source.

8. With the UltraSync-E main power switch in the Off position, make sure the power to the UltraSync-E is in the specified power limits. The power is measured between the main power switch and the power source.
9. Make sure that personnel are not doing maintenance on the UltraSync-E.
10. Make sure that all tools are removed from the area.
11. Make sure that the floors are clean.

2.16.2 Apply Power to the UltraSync-E

1. Set the main power switch (refer to Figure 2-1) to the ON position.
2. Set up the UltraSync-E controller.
   - Configure the controller to match your UltraSync-E hot runner:
     - Number of valve stems
     - Hot Runner Generation
     - Motor mounting location
     - Temperature sensor
   - Set open and close profiles to:
     - Open position: 7.4 mm
     - Close position: 0 mm
     - Speed: 50 mm/s
     - Acceleration/Deceleration: 500 mm/s^2
3. Bring hot runner to the operation temperature to satisfy At Temperature or External At Temperature condition.
4. On the UltraSync-E Home screen, wait for the soak timer to complete.
5. Change the UltraSync-E control mode to Disengage.
6. Touch the Calibrate button to start the valve stems calibration.
7. Wait for the calibration to complete.
8. Operate valve stems with the Open and Close manual control buttons to make sure there is correct actuation.
9. Make sure that the valve stems go to the closed position when the UltraSync-E controller or IMM E-stop is pushed and that an E-stop alarm occurs on the HMI.

   An E-stop alarm must occur on the HMI.
10. Make sure that the valve stems go to the closed position and the UltraSync-E stops when a guard or protective gate is opened.

For troubleshooting problems and errors, refer to Section 3.9.

Chapter 3 UltraSync-E Operation

This chapter describes the screens, controls, and troubleshooting specific to UltraSync-E systems. These screens and controls are not available when the controller is used with any other hot runner system.

IMPORTANT!

Controllers for UltraSync-E hot runners are designed for use with a specific hot runner. Contact the nearest Husky Regional Service and Sales office before attempting to use the controller with any other hot runner.

3.1 UltraSync-E Screens

UltraSync-E system settings and operations are the same on the Altanium Delta5 and Matrix5 controllers. Touch the **UltraSync-E** button in the Servo Control area of the Delta5 or Matrix5 Home screen to access the UltraSync-E screens. Refer to Figure 3-1.

NOTE: The screens shown in this user guide are from an Altanium Delta5 controller. The UltraSync-E screens on a Delta5 controller are the same as on a Matrix5 controller. The only difference is the display size. The operation of the UltraSync-E is the same for the two controller systems.

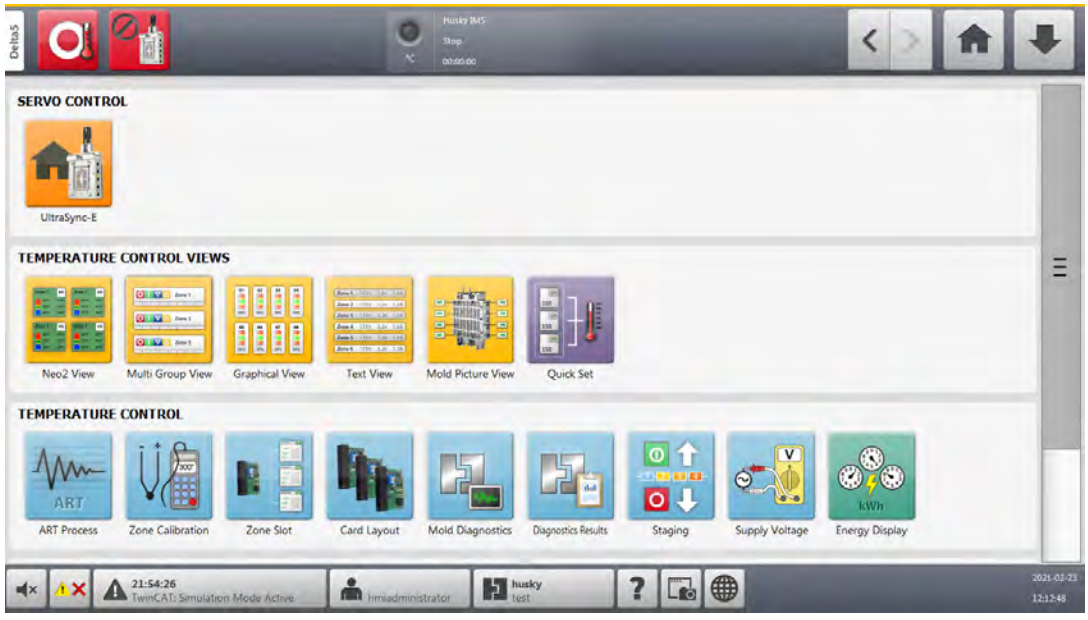


Figure 3-1 UltraSync-E Button on a Delta5 Home Screen

3.1.1 UltraSync-E Screen Tabs

Four main screens are used to configure the UltraSync-E:

- UltraSync-E Home (Section 3.3)
- Opening Profile (Section 3.5)
- Closing Profile (Section 3.5)
- Setup (Section 3.4)

Labeled tabs at the bottom of the UltraSync-E screens give access to the Home, Profiles, and Setup configurations.

3.2 UltraSync-E Configurations

The UltraSync-E system can be installed and operated as a standalone with one or two axes or integrated with one or more of the products that follow:

- Heats (temperature control)
- Altanium Servo Controller (ASC)
- UltraShot

3.2.1 UltraSync-E Standalone System

A Delta5 or Matrix5 controller can be configured with an UltraSync-E and no heats. The controller will not show heats-specific screens. Only the UltraSync-E screens and the common screens, such as Alarms and Event History, will show. This user guide has information for an UltraSync-E with heats controller. If your system is an UltraSync-E standalone, some settings in this user guide will not show on the UltraSync-E screens.

On the standalone system, the control mode buttons are shown side-by-side in the top bar, instead of in a drop-down list.

The heat zones status indicator at the top center of the screen is not shown.

3.2.2 UltraSync-E with Heats System

A Delta5 or Matrix5 controller can be configured with an UltraSync-E and heats. The controller will show the UltraSync-E and heats-specific screens. While many settings for the UltraSync-E and the heats are shown only on screens and windows for those operations, other settings are combined onto screens where the operational functions are related. This user guide has information for a controller with one UltraSync-E and heats installed.

3.2.3 Dual UltraSync-E System

A Matrix5 controller can be configured to operate two UltraSync-E systems. This configuration is not available with a Delta5 controller.

All functions are the same for each UltraSync-E, and they can be configured and operate independently of each other. With a second UltraSync-E installed, the differences on the controller are:

- The home screen shows two UltraSync-E buttons at the top of the screen (UltraSync-E 1, UltraSync-E 2).
- Permissions to enter or leave Engaged mode are ANDed between the two axes:
  - Both axes must be calibrated to enter Engaged mode
  - Both axes must permit disengaging to leave Engaged mode
- The mode switches to Disengaged if an axis has a fault and that UltraSync-E's 'Exit Engaged Mode After Fault' option is selected.
- The tab names become 'UltraSync 1 Home' and 'UltraSync 2 Home'
- The status control section of screen is labelled 'UltraSync-E 1 Status' or 'UltraSync-E 2 Status'.
- The Activate option's label on the UltraSync-E Setup screen shows 'UltraSync-E 1 - Activate' or 'UltraSync-E 2 - Activate'.

  When an UltraSync-E axis is deactivated, it will stay in Disabled mode regardless of the mode selection. The other axis will control all mode changes.
- Each of the selectable UltraSync-E output signals will show 'UltraSync-E 1' or 'UltraSync-E 2'.

3.3 UltraSync-E Home Screen

Use the UltraSync-E Home screen to monitor and control the UltraSync-E system. On the Altanium Delta5 or Matrix5 Home screen, touch the **UltraSync-E** button and then touch the **UltraSync-E Home** tab. The UltraSync-E Home screen is shown in Figure 3-2.

Figure 3-2 UltraSync-E Home Screen

1. Control Modes Buttons Drop-Down **2.** Control Bar **3.** Control Bar Status Fields **4.** Manual Control Buttons **5.** UltraSync-E Home Screen Tab **6.** Opening Profile Tab **7.** Closing Profile Tab **8.** Setup Tab

3.3.1 Control Modes Buttons

Use the Control Mode buttons to change the UltraSync-E mode between Disengaged and Engaged. Table 3-1 gives descriptions of the Control Mode buttons.

Table 3-1 Control Modes Buttons

Button	Description
	**Engaged** Activates Engaged mode, where the UltraSync-E is controlled by remote inputs.

Table 3-1 Control Modes Buttons (Continued)

Button	Description
	**Disengaged** Activates Disengaged mode, where the UltraSync-E is controlled by the operator with the use of the Altanium user interface.
	**Disabled** The UltraSync-E servo system is disabled.

3.3.2 Manual Control Buttons

The Manual Control buttons are used to change the position of the valve gates, indicate current position of the stems, and to calibrate UltraSync-E. Table 3-2 gives the descriptions of the Manual Control buttons.

Table 3-2 Manual Control Buttons

Button	Description
	**Close Valve Gates** This button closes the valve gates. When the stems are at the close position, the button is highlighted with a yellow outline.
	**Open Valve Gates** This button opens the valve gates. When the stems are at the open position, the button is highlighted with a yellow outline.
	**Calibrate** This button starts the calibration sequence.

3.3.3 Ready Conditions

The Ready Conditions status indicators show what steps are required to put the UltraSync-E into Engaged mode. The indicators are described in Table 3-3.

Table 3-3 Ready Condition Indicators

Indicator	Description
IMM E-Stop OK	Indicates the state of the IMM Emergency Stop (E-Stop).
IMM Safety Gates Closed	Indicates the IMM safety gates are closed.
Controller E-Stop OK	Indicates s the state of the UltraSync-E cabinet E-Stop.
At Temperature	Indicates that the system is “At Temperature”. On an UltraSync-E system with integrated hot runner temperature control, this is the system “At Temperature” status. On a stand alone UltraSync-E system, this is the state of the “At Temperature” digital input.
Soak Time Remaining	Shows the time remaining on the soak timer countdown.
Soak Time Complete	Indicates that the soak time countdown is complete.
Servo Drive Enabled	Indicates that the servo drive is powered and enabled.
Calibration OK	Indicates that the UltraSync-E is calibrated.

3.3.4 Control Bar Status Fields

These fields give information about the status of the UltraSync-E servo system. The fields are described in Table 3-4.

Table 3-4 Status Fields

Status Field	Description
Active Command	Shows the current command executed by UltraSync-E.
Plate Position	Shows the current position of the valve stems.
Total Force	Shows the force that is applied by the UltraSync-E motor.

3.3.5 Process Values

Use Process Values area of the screen lets you see the values recorded during the last Engaged cycle. The values are described in Table 3-5.

Table 3-5 Process Values

Process Value Fields	Description
Open Duration	Shows the elapsed time of the last open motion.
Close Duration	Shows the elapsed time of the last close motion.
Open Position	Shows the final position of the last open motion.
Close Position	Shows the final position of the last close motion.
Opening Peak Force	Shows the peak force during the last open motion.
Closing Peak Force	Shows the peak force during the last close motion.

3.3.6 Status Area

This area of the UltraSync-E Home screen gives the position of the UltraSync-E motor and indicates if there is an active UltraSync-E fault.

3.4 UltraSync-E Setup Screen

Configure the UltraSync-E advanced options on the UltraSync-E Setup screen. The UltraSync-E can only be configured when the user level is sufficient and UltraSync-E is not engaged.

On the Altanium Delta5 or Matrix5 Home screen, touch the **UltraSync-E** button and then touch the **Setup** tab. The UltraSync-E Setup screen is shown in Figure 3-3.

Figure 3-3 UltraSync-E Setup Screen

3.4.1 Monitoring

The Monitoring section lets you set valve stem open and closed position and force tolerance ranges, as described in Table 3-6.

Table 3-6 Monitoring Settings

Monitoring	Description	Minimum	Maximum	Default
Always At Position When in Window	When Enabled, the “At Open” or “At Close” signals are TRUE when the axis is calibrated and Open/Close position is within the user-configurable “At Position” window. When not Enabled, the conditions that follow are also necessary: • The drive is enabled. • The command to Open or Close position has completed. • The drive is held in position with a hold force or relaxed.	-	-	-
At-Position Window (+/-)	The position range in which the valve stems are reported “At Open Position” or “At Close Position”.	0.01 mm 0.000 in	1.00 mm 0.039 in	0.10 mm 0.004 in

Table 3-6 Monitoring Settings (Continued)

Monitoring	Description	Minimum	Maximum	Default
Position Deviation Tolerance (+/-)	If the position of the valve stems deviates from the set position by more than this amount, the alarm "Position Deviation Limit Exceeded" is generated. Position is monitored during motion and when held at the open or close positions.	0.01 mm 0.000 in	0.50 mm 0.020 in	0.05 mm 0.002 in
Force Warning Level	The force level at which a warning is generated. The force warning level is calculated as a percentage of the Opening or Closing force limit.	0%	100%	95%

3.4.2 Other Settings

In the Other Settings area of the screen, configure the relax settings and use the At Temperature Soak Time field to set the soak time. The Other Settings fields and selections are described in Table 3-7.

Table 3-7 Other Settings Fields and Selections

Item	Description
UltraSync-E - Activate	Enable this check box to activate the UltraSync-E axis. When the UltraSync-E is deactivated, it does not operate in Disengaged or Engaged mode, and any faults or alarms from UltraSync-E are ignored.
At Temperature Soak Time	Valve stems cannot be actuated until the soak time countdown has completed. The soak time begins when the "At Temperature" status is TRUE. Use this field to set the duration of the soak timer.
Relax Force Limit	The force limit used after the Relax Delay has expired. This force limit should be set lower than the operating force limits. Its function is to decrease energy consumption and prevent overheating of the servo system and motor during long idle periods. The minimum value is 0 kN (0 lbf), and the maximum value is related to each tool. The default value is 10 kN (2248.1 lbf).
Relax Delay	The delay time before the Relax Force Limit is applied. The timer starts at the end of the previous motion. The minimum time is 0 seconds, and the maximum time is 120 seconds. The default time is 60 seconds.

Table 3-7 Other Settings Fields and Selections (Continued)

Item	Description
Enter Engaged Mode After Calibration	If selected, the UltraSync-E immediately changes to Engaged mode after the calibration completes.
Exit Engaged Mode After Fault	When enabled, the UltraSync-E changes modes from Engaged to Disengaged when there is a fault. When disabled, the UltraSync-E stays in Engaged mode if there is a fault.

3.4.3 Motor Thermal Status

In the Motor Thermal Status area of the screen, two information fields give the temperature status of the UltraSync-E servo motor. Refer to Table 3-8.

Table 3-8 Motor Thermal Status

Item	Description
Motor Temperature	This field gives the current temperature of the servo motor.
Motor I2T Actual Value	This value counts up when the motor is under load, and counts down when the motor is at rest. When this value gets to 100%, the motor is disabled to prevent damage.

3.4.4 Setup Buttons

There are four Setup buttons on the UltraSync-E Setup screen. These buttons give access to the UltraSync-E configuration settings windows that follow:

- Signals
- Maintenance
- Hot Runner
- Pullback

The subsections that follow describe the settings and indicators on the UltraSync-E configuration windows.

3.4.4.1 Signals

Use the Signals window to configure the features that follow:

- Input Signal
- Permit Calibration

- Permit Disengaging
- Engaged Mode Commands

From the UltraSync-E Setup screen, touch the **Signals** button to see the Signals window. Refer to Figure 3-4.

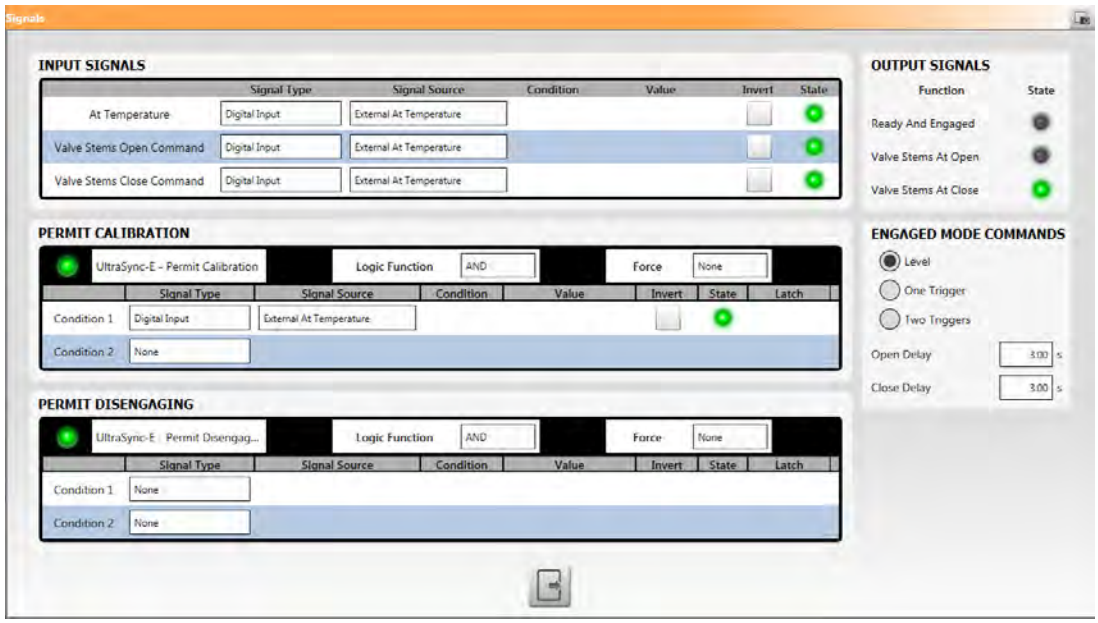


Figure 3-4 Signals Window

3.4.4.1.1 Input Signals

Input signals to the UltraSync-E are configurable. The signal types used are:

- None
- Digital Input
- Configurable Signal
- Temperature Control

The available signals are related to the signal type that is selected.

The three Input Signals are described in Table 3-9.

Table 3-9 Input Signals

Input Signal	Description
At Temperature	When this signal occurs (TRUE), it starts the UltraSync-E At-Temperature Soak Timer. When there is no signal (FALSE), the Soak Timer resets. The defaults are: • UltraSync-E Standalone: the Signal Type is "Digital Input" and the Signal is "External At Temperature". • UltraSync-E Integrated: the Signal Type is "Temperature Controller" and the Signal is "At Temperature". This uses the heats at-temperature signal.
Valve Stems Open Command	This input is used to start the Stems Open command when UltraSync-E is in Auto/Engaged mode. The default Signal Type is "Digital Input" and the Signal is "UltraSync-E Stems Open Command".
Valve Stems Close Command	This input is used to start the Stems Close command when UltraSync-E is in Auto/Engaged mode. The default Signal Type is "Digital Input" and the Signal is "UltraSync-E Stems Close Command".

3.4.4.1.2 Permit Calibration

The conditions and information for Permit Calibration follow:

- Use of this input helps prevent calibration when damage could occur, such as when the mold is closed with parts in the cavities.
- This configurable input signal must be TRUE to start the valve stem calibration.
- The signal type selections are Digital Input and None.
- If the input is lost during calibration, the calibration sequence is cancelled.
- The signal is configured with two "anded" conditions.
- The default conditions are:
  - External Permit Calibration digital input, not inverted.
  - IMM in Auto digital input, inverted.

3.4.4.1.3 Permit Disengaging

The conditions and information for Permit Disengaging follow:

- Use of this input helps prevent a change to Disengage mode when damage could occur, such as when the IMM is still auto cycling and injecting plastic into the mold with the stems closed.
- This configurable input signal must be TRUE to let the system to go into Disengage mode.
- The signal type selections are Digital Input and None.
- The signal is configured with two "anded" conditions.
- The default conditions are:
  - None.
  - None.

3.4.4.1.4 Output Signals

The Output Signals area of the screen gives indicators for the UltraSync-E outputs that follow:

- Ready And Engaged (Indicates that the UltraSync-E is in Engaged mode with no faults.)
- Valve Stems At Open
- Valve Stems At Close

Refer to Section 3.6.2 about screen access to these outputs and their descriptions.

3.4.4.1.5 Engaged Mode Commands

The controller has three input signal configurations that control the Open and Close operations of the valve stems from the machine. Refer to Table 3-10.

An Engaged Mode Command must be configured according to how the machine sends its Open and Close signals. Use the Engaged Mode Commands on the Signals screen to change the control modes.

Table 3-10 Engaged Mode Commands

Input Signal Configuration	Description	Open Valve Stems Command Examples	Description
Level	Valve stems open after the Open command signal is active and the Open Delay timer is complete. Valve stems stay open until the Open command signal is inactive and the Close Delay timer is complete.	• Configurable output • Valve gate open	—
One Trigger	Valve stems open after the Open command signal is active and the stem Open Delay timer is complete. Valve stems stay open until the stem Close Delay timer is complete.	• Clamp closed • Mold close • Machine nozzle shutoff • Configurable output	—
Two Triggers	Valve stems open after the Open command signal is active and the stem Open Delay timer is complete. Valve stems stay open until the Close command signal is active and the stem Close Delay timer is complete.	• Clamp closed • Mold close • Machine nozzle shutoff • Configurable output	• Hold • Valve Gate Close

3.4.4.2 Maintenance

From the UltraSync-E Setup screen, touch the **Maintenance** button to see the Maintenance window. Refer to Figure 3-5.

Use the Maintenance dialog window to configure the maintenance position for Generation 1 tools. The settings are:

- Position - Used to set maintenance position to which the tool moves. Can be set to a maximum of 20 mm. The default setting is 16.4 mm.
- Speed - Used to set the movement speed to get to the maintenance position. Can be set to a maximum of 5 mm/s. The default setting is 1mm/s.
- Force Limit - Used to set the movement force limit for the configured tool. The default is 2 kN on a new installation, but it is set to maximum when tool configuration is changed.

The maintenance position command button and settings are accessible only when logged in with the applicable security level and with the conditions that follow:

- The Gen 1 tool is selected
- The Ready for Command is TRUE
- The UltraSync-E is in Disengage mode
- The At-Temperature or External At-Temperature signal is active
- The bench plug is installed

Figure 3-5 Maintenance Window

3.4.4.3 Hot Runner

From the UltraSync-E Setup screen, touch the **Hot Runner** button to see the Hot Runner window. Refer to Figure 3-6.

Use the Hot Runner window to configure the UltraSync-E controller for the hot runner tool it is actuating. These settings can only be changed in Disabled mode.

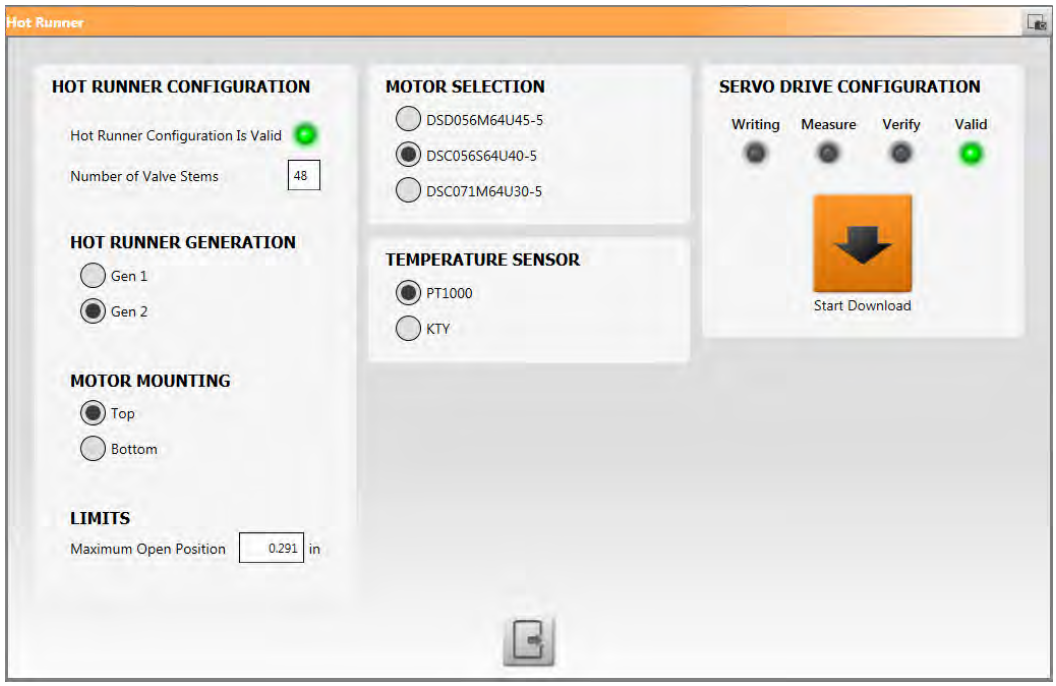


Figure 3-6 Hot Runner Window

3.4.4.3.1 Hot Runner Configuration

Number of Valve Stems

CAUTION!

The 'Number of Valve Stems' field should only be changed with the instruction of a trained Husky service technician. The setting has an effect on the amount of force that the motor applies to the plate to which the valve stems are attached. If the number of valve stems is set higher than the physical configuration in the hot runner, it could result in damage to the plate.

In the Hot Runner Configuration area of the window, you must select the number of valve stems used in the mold. Touch the **Number of Valve Stem** field and select the number of stems from the list.

Hot Runner Generation

Gen 1 refers to the first generation UltraSync-E design. Gen 1uses different settings than the current Gen 2 design. For the Gen 1 design:

- The maximum open setting is usually 10 mm.
- The UltraSync-E must be put in a maintenance position to separate the hot runner for the actuation assembly components to be serviced. Refer to Figure 3-5.
- A different model servo motor is used.

To identify the Hot Runner Generation installed on the IMM, touch the **Gen 1** or **Gen 2** circle, so the dot shows for that selection.

Motor Mounting

You can select motor mounting to Top or Bottom. When Top is selected, the motor rotates clockwise to close the stems. When Bottom is selected, the motor rotates counter clockwise to close the stems. The default is Top.

To identify the UltraSync-E Motor Mounting, touch the **Top** or **Bottom** circle, so the dot shows for that selection.

Limits

You can set the maximum valve gate Open position. The minimum is 0 mm. The maximum is usually:

- 10.0 mm (0.394 in) for Gen 1
- 7.4 mm (0.291in) for Gen 2

Touch the **Maximum Open Position** field to set maximum permitted limit. Enter the limit and touch the **Accept** button.

3.4.4.3.2 Motor Selection

There are three types of motors used for the UltraSync-E systems. The motor installed on your UltraSync-E system must be identified, so the controller software can operate the movements correctly. In the Motor Selection area of the window, touch the circle next to the motor installed on your system, so the dot shows for that selection. The motors are identified by model number:

- DSD056M64U45-5 (used for a low-cavity UltraSync-E)
- DSD056S64U40-5 (used for a low-cavity UltraSync-E)
- DSC071M64U30-5 (used for a high-cavity UltraSync-E)

The UltraSync-E is available in low-cavity (up to 64 cavities) and high-cavity (over 64 cavities) systems. The operation of low- and high-cavity systems is the same. The differences in the motors are their continuous and peak force limits, so it is important is that the correct motor is selected to operate the number of valve stems in the system.

Contact Husky Technical Support if you are not sure what motor is installed on your system.

3.4.4.3.3 Temperature Sensor

In the Temperature Sensor area of the window, identify the sensor installed in the motor attached to your UltraSync-E hot runner system. Touch the circle next to the sensor, so the dot shows for the selection.

3.4.4.3.4 Servo Drive Configuration

Each motor has its own related parameter set. Operation of the UltraSync-E is not permitted until the parameter set of the selected motor has been downloaded and saved to the servo drive.

To do a parameter set download, select the motor that is installed on your system (Section 3.4.4.3.2) and touch the **Start Download** button.

The status of the active parameter set is displayed with indicators above the Start Download button: Writing, Measure, Verify, and Valid. The download process is complete when the Valid indicator illuminates.

3.4.4.4 Pullback

Pullback is an optional motion that occurs after the stems Close motion. In the UltraSync-E Setup screen, touch the **Pullback** button to see the Pullback dialog window. Refer to Figure 3-7.

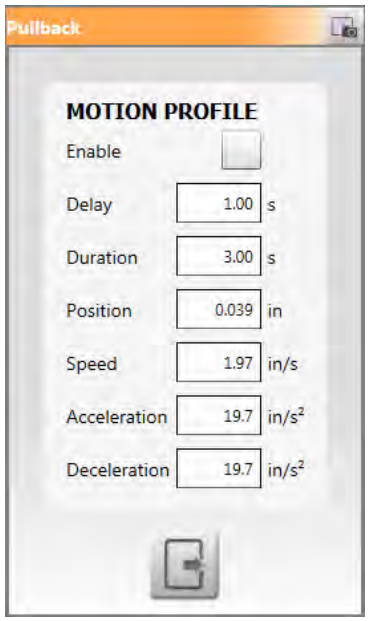


Figure 3-7 Pullback Dialog Window

During Pullback open motion, the open force limit is used. The motion profile is defined on the Pullback dialog window. During Pullback close motion, the close force limit and motion profile are used.

The Pullback motion profiles are described in Table 3-11.

Table 3-11 Pullback Motion Profiles

Item	Description
Enable	Set this to use the pullback motion.
Delay	The delay timer starts when the valve stems get to the closed position. When the delay timer expires, the pullback motion starts.
Duration	The duration timer starts when the pullback motion starts. When the duration timer expires, the valve stems move to the closed position.
Position	The valve stems open to this position during pullback. When valve stems get to this position, they will continue to open at a slower speed until the duration timer expires.

Table 3-11 Pullback Motion Profiles (Continued)

Item	Description
Speed	The speed used for the open operation of the pullback motion.
Acceleration	The acceleration used for the open operation of the pullback motion.
Deceleration	The deceleration used for the open operation of the pullback motion.

3.5 UltraSync-E Opening Profile and Closing Profile Screens

Use the UltraSync-E Opening and Closing Profile screens to setup and view the motion profiles used to open and close the valve stems. The Opening and Closing Profile screens are shown in Figure 3-8 and Figure 3-9.

WARNING!

Changes to the valve stem profile that could make the valve stems close on cold resin will result in damage to the valve stems and gates. This is especially likely with engineering resins such as polycarbonate.

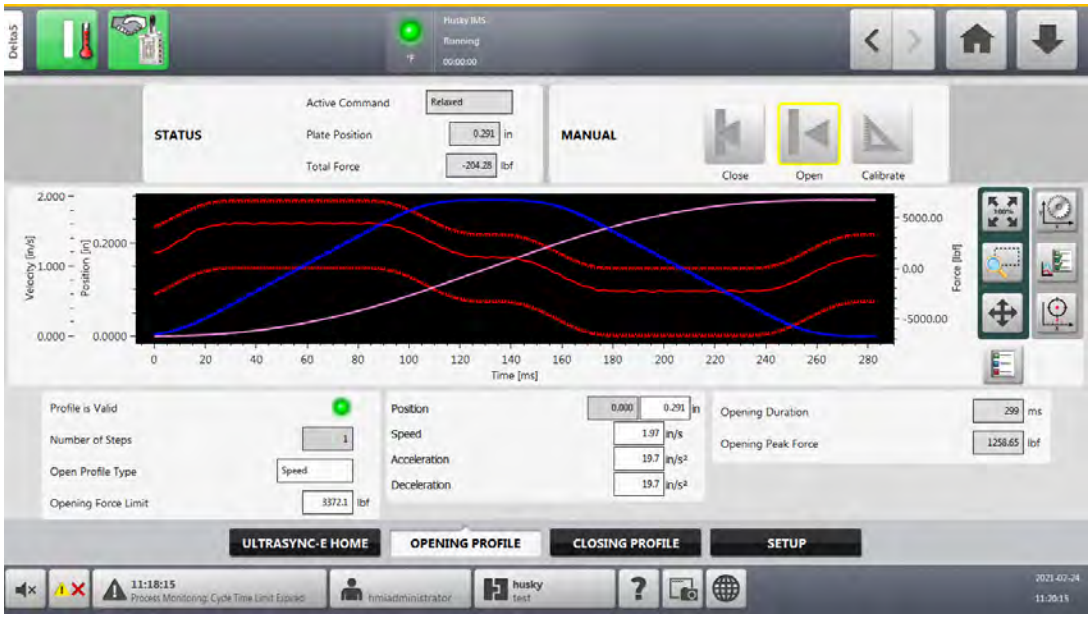


Figure 3-8 UltraSync-E Opening Profile Screen

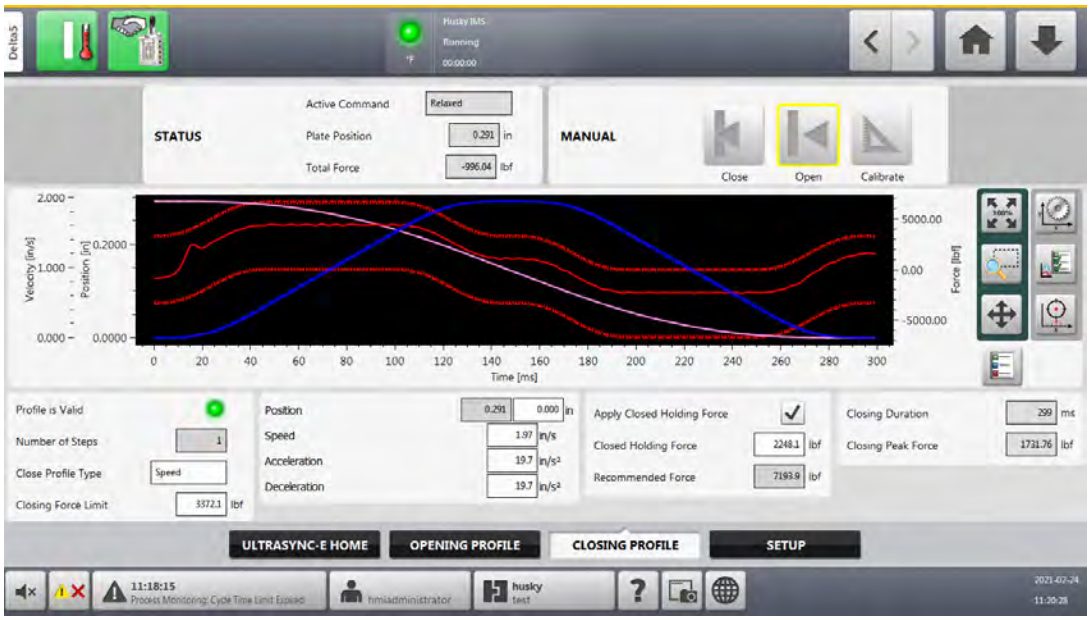


Figure 3-9 UltraSync-E Closing Profile Screen

3.5.1 Chart View and Adjustment Selections

Table 3-12 shows a list of the chart view and adjustment selections used on the Opening and Closing Profile screens.

Table 3-12 Chart View and Adjustment Selections

Button	Description
	Returns the chart view to 100%.
	Used to magnify a specific area of the chart.
	Used to adjust the chart view when magnified.
	Shows a legend to identify the chart traces.

Table 3-12 Chart View and Adjustment Selections (Continued)

Button	Description
	Used to set the scale for the chart traces that follow: • Position (when Position is selected for the chart X axis) • Time (when Time is selected for the chart X axis) • Force • Position Deviation • Velocity
	Lets the user select the traces that are seen on the chart: • Velocity • Velocity Setpoint • Velocity Limit • Force • Force Warning Level • Force Limit • Position Deviation • Position (when Time is selected for the chart X axis)
 	Toggles between Time and Position on the chart X axis.

3.5.2 Opening/Closing Profile Screen Settings and Indicators

Table 3-13 gives the descriptions of the settings that are common to both the Opening and Closing Profile screens.

Table 3-13 Settings for the Opening and Closing Profile Screens

Opening and Closing Profiles	Description	Minimum	Maximum	Default
Profile is Valid	If the open motion profile or close motion profile is valid this indicator illuminates. If the profile is not valid, the last-used valid profile will remain active.	-	-	-
Number of Steps	Used to set the number of profile steps used during the motion.	1	Opening: 2 Closing: 3	1
Profile Type (Open/Close)	There are three configurable profile types: • Speed - Lets you set the Speed, Acceleration, and Deceleration (shown in the Profile area of the screen) • Time (Minimize Velocity) - Lets you set the time duration (shown in the Profile area of the screen) • Time (Minimize Acceleration) - Lets you set the time duration (shown in the Profile area of the screen)	-	-	-
Force Limit (Open/Close)	Maximum force limit applied to all steps in the motion.	0.0 kN	Per tool	Tool maximum
Speed	The speed limit of the step. May not be achieved, depending on travel distance, acceleration and deceleration limits. (Used when "Speed" is selected for the Profile Type.)	0.1 mm/s	50 mm/s	50 mm/s
Acceleration	The acceleration limit of the step. May not be achieved, depending on travel distance of the step. (Used when "Speed" is selected for the Profile Type.)	1 mm/s^2	500 mm/s^2	500 mm/s^2

Table 3-13 Settings for the Opening and Closing Profile Screens (Continued)

Opening and Closing Profiles	Description	Minimum	Maximum	Default
Deceleration	The deceleration limit of the step. May not be achieved, depending on travel distance of the step. (Used when "Speed" is selected for the Profile Type.)	1 mm/s^2	500 mm/s^2	500 mm/s^2
Position	Sets the end position of the motion. If two or three steps are used, this sets the switch position between steps.	-	Close: 0.0mm Open (Gen1): 10.0 mm Open (Gen2): 7.4 mm	Maximum

Table 3-14 gives the descriptions of the settings that are configured only on the Closing Profile screen.

Table 3-14 Closed Holding Force Settings

Closed Holding Force	Description	Minimum	Maximum	Default
Apply Closed Holding Force	If enabled, a constant force is applied in the close direction when the stems get to the closed position. If disabled, the motor only uses the minimum force necessary to hold the stems in the closed position.	-	-	Enabled
Closed Holding Force	The continuous force applied.	0.0 kN	Per tool	Tool recommended
Recommended Force	The recommended Closed Holding force for the selected tool.	-	-	Per tool

3.5.3 Opening Profile Graph

Use the Opening Profile graph to monitor and configure the valve stem open motion profile. The Process Values area of the Opening Profile screen gives the results of the last completed open motion as described in Table 3-15.

Table 3-15 Opening Motion Process Value Results

Item	Description
Opening Duration	The elapsed time of the last valve stem open motion.
Opening Peak Force	The peak force recorded during the last valve stem open motion.

3.5.4 Closing Profile Graph

Use the Closing Profile graph to monitor the valve stem close motion profile. The Process Values area of the Closing Profile screen gives the results of the last completed close motion as described in Table 3-16.

Table 3-16 Closing Motion Process Value Results

Item	Description
Closing Duration	The elapsed time of the last valve stem close motion.
Closing Peak Force	The peak force recorded during the last valve stem close motion.

3.6 I/O Screens

Use the I/O screens to see the status and setup the digital inputs, digital outputs, configurable signals, and safety signals that are transmitted between the UltraSync-E controller and IMM.

The configurations found on the Digital Input and/or Output screens are organized under the item headings described in Table 3-17.

Table 3-17 Digital Input and/or Output Screen Headings

Item	Description
State	The current state of the input or output.
Name	Name given to the input or output signal by the user. This name is used throughout the system.
Signal Type	The type of output signal is specified here. The selections are: • Digital Input • Controller Function • Configurable Signal • UltraSync-E • Temperature Control • None

Table 3-17 Digital Input and/or Output Screen Headings (Continued)

Item	Description
Signal Source	These are the output signals that are available for selection by the Signal Type was selected. The Signal selected determines the function of the output.
Invert	If selected, the inverse of the signal's usual operation will be TRUE.
Force	Each I/O can be forced to High, Low, or not forced. When Force is set to "High", the signal level at the pin is set high. When Force is set to "Low", the signal level at the pin is set low. When Force is set to "None", the signal level at the pin is unchanged by this setting.
Level	Indicates the electrical state of the input or output at the pin on the connector on the outside of the UltraSync-E controller. This equals the logical state after the input or output has been inverted by a Normally Close signal.
Pins	Text fields that shows the connector and pins that the input or output signal is physically wired to on the outside of the UltraSync-E controller.

3.6.1 Inputs

Use the Servo Digital Inputs screen to configure the digital input signals from the injection molding machine.

To get access to the digital input configurations, do the steps that follow:

1. On the Altanium Matrix5 or Delta5 Home screen, touch the **I/O** button.
2. Touch the **Digital Inputs** tab and then the **Servo** tab.

   The Digital Inputs - Servo screen shows. Refer to Figure 3-10.

Figure 3-10 Servo Digital Inputs Screen

Inputs from the IMM are described in Table 3-18.

Table 3-18 Inputs from the IMM

Signal Name	Description	Pin (s)
24 VDC of Controller	Reference HIGH level from the valve gate controller, for dry contacts. This signal is necessary for operation.	21
IMM in Auto	Active when IMM is cycling in Automatic. Signal is used to prevent valve gate servo controller from being put into manual or disabled mode. This signal is optional.	22
External At Temperature	Active when all heat zones are within their defined tolerance range. This is used to trigger a soak timer, which when complete enables the operation of the valve stems. This signal is necessary for operation when not integrated with a heat controller.	23
UltraSync-E Stems Open Command	Command to open valve gates when controller is in engaged/auto mode. This signal is necessary for operation.	24

Table 3-18 Inputs from the IMM (Continued)

Signal Name	Description	Pin (s)
UltraSync-E Stems Close Command	Command to close valve gates when controller is in engaged/auto mode. This signal is necessary for operation if a Two Trigger system is used.	25
External Permit Calibration	Active when valve gate calibration is permitted. This signal is optional.	26
Servo Digital Input 6 - 10	Other digital inputs to be used when necessary. These signals are optional.	27, 28, 29. 30. 31

3.6.2 Outputs

Use the Servo Digital Outputs screen to configure the digital output signals to the injection molding machine.

To get access to the digital output configurations, do the steps that follow:

1. On the Altanium Matrix5 or Delta5 Home screen, touch the **I/O** button.
2. Touch the **Digital Outputs** tab and then the **Servo** tab.

   The Digital Outputs - Servo screen shows. Refer to Figure 3-11.

Figure 3-11 Servo Digital Outputs Screen

Outputs to the IMM are described in Table 3-19.

Table 3-19 Outputs to the IMM

Signal Name	Description	Pin (s)
IMM Signal Reference	Reference signal from IMM for dry contacts.	5, 6
Fault Stop Immediate	Active when clamp motion is permitted. These contacts are opened when an immediate stop is required for the machine, due to a fault or alarm on the controller.	8, 9
UltraSync-E Ready and Engaged	Active when controller is enabled with no faults, in auto/engaged mode.	10
UltraSync-E Stems at Open	Active when all of the following conditions are true: -Valve gate controller is ready and engaged -Valve stems are at open position -Valve gate controller is in auto/engaged mode This signal can be used to provide injection permission to the IMM.	11
UltraSync-E Stems at Close	Active when valve gate stems are at closed position, and controller is enabled.	12
Servo Digital Output 5 - 7	Other digital outputs to be used when necessary.	13, 14, 15

3.6.3 Configurable Signals

Configurable signals are outputs defined with the use of Boolean logic. Input functions, output functions, and other configurable signals can be assigned as conditions to a given configurable signal that when all are TRUE the signal is active.

To set configurable signals for the system, do the steps that follow:

1. On the Altanium Home screen, touch the **I/O** button.
2. Touch the **Configurable Signals** tab at the bottom of the screen.

   The Configurable Signals screen shows. Refer to Figure 3-12.

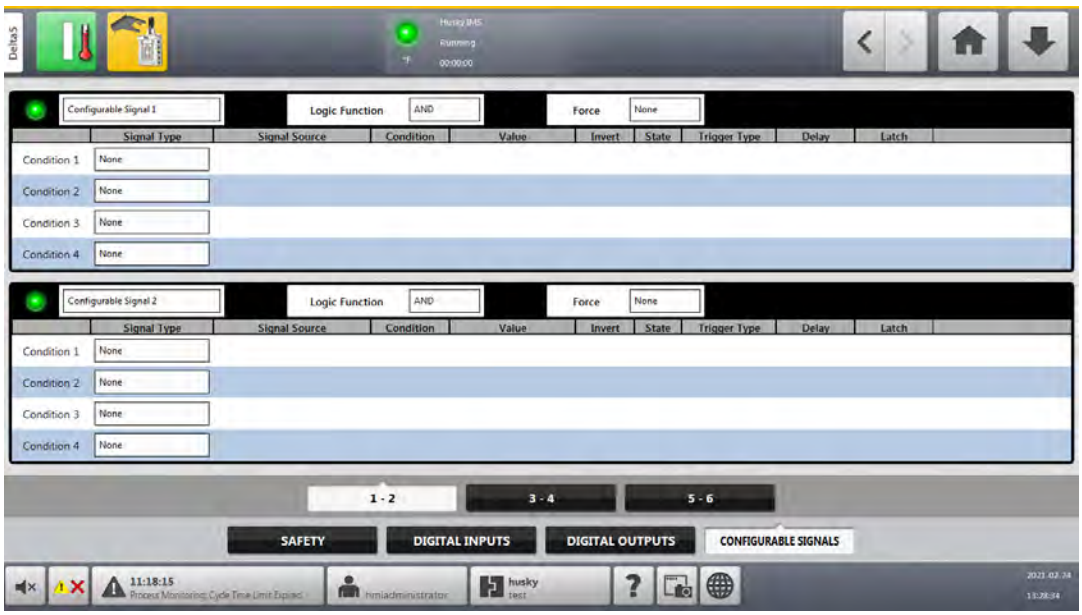


Figure 3-12 Configurable Signals Screen

The Altanium Matrix5 controller has 18 configurable signals and the Altanium Delta5 has 6 (shown in Figure 3-12). The tabs near the bottom of the screen give access to the signals. Three signals are shown on each screen (tab) for the Matrix5 and two signals are shown on each screen for the Delta5.

The items on the Configurable Signals screen are described in Table 3-20.

Table 3-20 Configurable Signal Screen Items

Item	Description
Name	Name given to the configurable signal by the user. This name is used throughout the system.
Logic Function	Sets the logic function that is applied to the conditions of a configurable signal. The selections are AND, OR, and LATCHING.
Force	You can force a configurable signal to: • High - the signal level is set high. • Low - the signal level is set low. • None - the signal level is unchanged by this setting
Signal Type	Defines the type of signal. The choices are Function, Digital Input, Configurable Signal or None.
Signal Source	Defines what signals are available for selection based on the signal type selected. The signal selected determines the function of the condition.
Condition	These are “anded” conditions that must all be true for the configurable signal to become active.
Invert	If selected, the inverse of the signals normal operation will be true.

Table 3-20 Configurable Signal Screen Items (Continued)

Item	Description
State	Indicates that the condition is TRUE when the indicator is illuminated.
Latch	The Latch logic function lets the configurable signal stay in its state even after the trigger signal condition is removed. The signal stays in this state until another condition row changes it.
Condition 1-4	These are the conditions you can set for the configurable signal. Up to four conditions can be set. The condition rows are evaluated in the order that they are listed, top to bottom. Thus when two or more conditions are TRUE at the same time, with opposite actions (both latch and unlatch), the condition that is lower selects the final state.

3.6.4 Safety Signals

Safety signals are non-configurable fixed signals hardwired to the safety relay inside the UltraSync-E controller. These signals are connected to the IMM safety gate and E-stop circuits to make sure the system is safe for the user. The system will not run unless these signals are correctly connected.

To see the Safety Signals screen, touch the **I/O** button on the Altanium Home screen and then touch the **Safety** tab. Refer to Figure 3-13 and Table 3-21.

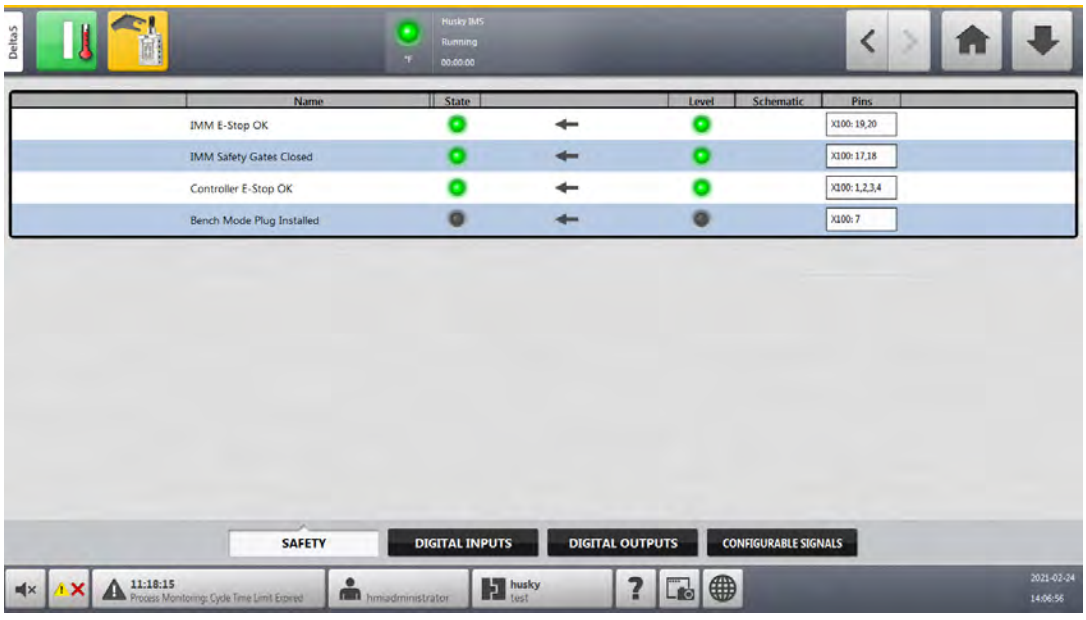


Figure 3-13 Safety Signals Screen

Table 3-21 Safety Signals

Signal Name	Description	Pin (s)
IMM E-Stop OK	The switch contact must be OPEN when the IMM emergency stop device is being actuated. Opening the switch contact causes an emergency stop of valve gate stem movement. This signal is necessary for operation.	19, 20
IMM Safety Gates Closed	The switch contact is CLOSED when safety devices on the IMM (such as gates) permit the injection of plastic. The signal must be the result of limit switch contact series of mold area safety devices according to EN201. This signal is necessary for operation.	17, 18
Controller E-Stop OK	E-Stop button on UltraSync-E controller. OPEN when the UltraSync-E controller emergency stop device is being actuated. Opening the switch contact must cause an emergency stop of the IMM. (2 Channels) This signal is optional.	1, 2, 3, 4

3.7 Trend and History Plots

The Altanium Matrix5 and Delta5 controllers let you set trend and history plots for the different heat zones and for process monitoring (cycle time). With that, trend and history plots can also be set for UltraSync-E variables.

The UltraSync-E trend and history plot variables that can be set and monitored are:

- Close Position
- Closing Duration
- Closing Peak Force
- Motor I2T
- Motor Temperature
- Open Position
- Opening Duration
- Opening Peak Force

For information about the use of the trend/history plots and setting the cycle mode configuration for the UltraSync-E, refer to Chapter 12 Data Recording in the Matrix5 or Delta5 user guide.

3.8 Calibrating the UltraSync-E

Each time Altanium is powered on it is necessary to calibrate the UltraSync-E in order to move the valve stems.

To calibrate the UltraSync-E, do the steps that follow:

1. Make sure that the UltraSync-E is in Disengaged mode. If not, do the sub-steps that follow:
   a. Touch the UltraSync-E control modes button at the top left of the screen, so the drop-down buttons show.
   b. Touch the **Disengaged** button.

2. Make sure the soak time is complete.

   The Soak Time Done indicator on the UltraSync-E Home screen is illuminated.
3. Make sure the Servo Drive Enabled status is TRUE.

   The Servo Drive Enabled indicator on the UltraSync-E Home screen is illuminated.
4. On the I/O screen (Digital Inputs and Servo tabs), make sure that the External Permit Calibration signal is present, if this signal is configured on the UltraSync-E Signals screen.
5. From an UltraSync-E screen, touch the **Calibrate** button.

   When the calibration completes correctly, the Calibration OK indicator on the UltraSync-E Home screen will illuminate.

3.9 Troubleshooting

This section describes troubleshooting methods and possible solutions for problems that could occur during operation and/or setup of an UltraSync-E system.

The problems shown are not a complete list. If a problem is not listed in this section, contact Husky Technical Support or the nearest Husky Regional Service and Sales office for help.

3.9.1 Drive Fault (Error Code #)

This fault from the servo drive system can occur for many reasons. To diagnose the problem, complete the steps that follow in order.

NOTE: Refer to the Altanium Matrix5 or Delta5 user guide for information about alarms.

1. Make sure the servo cables are connected and the servo motor power switch is in the ON position.
2. Do the steps that follow to try to reset the fault:
   a. On the Alarm screen, touch the **Clear Alarm** button to silence the alarm.
   b. Touch the **Reset** button once, then wait two to three seconds. If the alarm does not clear, try to reset again.
3. Look at the status of the electrical components and make sure that what follows following is true:
   - Main fuses F1 have not opened (light indicators show if a fuse is open or closed) or main breaker Q1M is not tripped (voltage system dependant)
   - Circuit breaker Q1M is on (switch is in the up position)
   - DC power supply G1 is active (green LED on)
   - 3 green LEDs on safety relay K1 are all on if the machine safety gates are closed (only the first "Power" LED will be on if the safety gates are open)

Depending on when the controller was manufactured, the servo drive can be a BMAXX 4000 or BMAXX 5000. To identify which drive type is installed in your controller, Figure 3-14 shows the BMAXX 4000 servo drive and Figure 3-15 shows the BMAXX 5000 servo drive.

Figure 3-14 BMAXX 4000 Servo Drive Unit

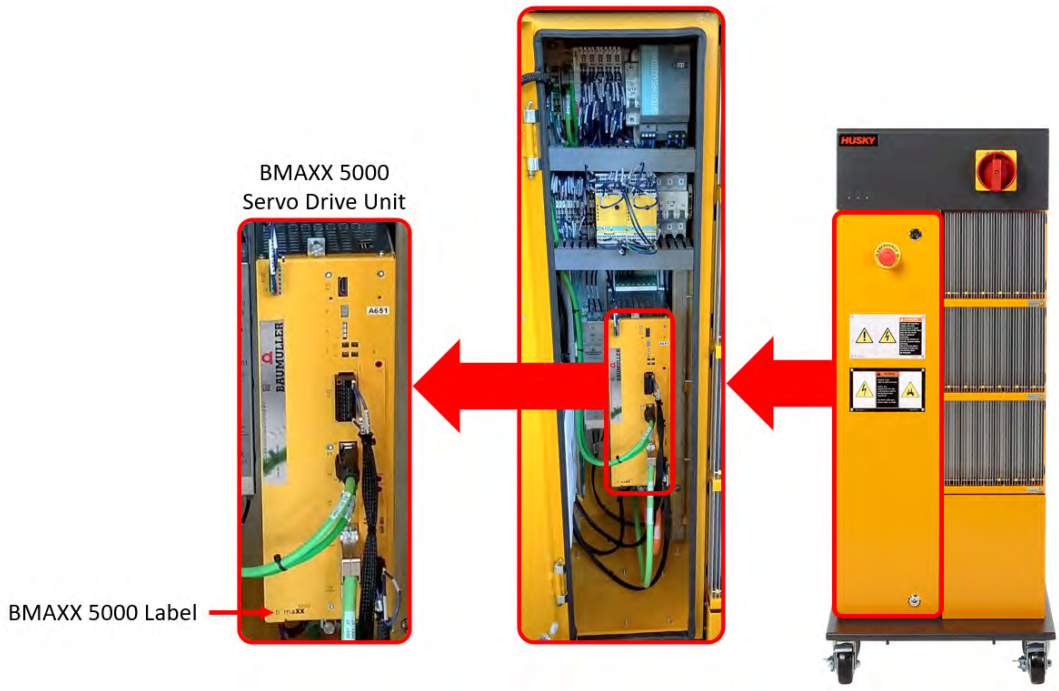


Figure 3-15 BMAXX 5000 Servo Drive Unit

Table 3-22 identifies the BMAXX 4000 drive faults and gives their possible solutions.

Table 3-22 BMAXX 4000 Drive Faults

Fault Number	Fault	Solution
1	Watchdog error	Internal error. De-energize and then energize the power to the drive.
2	Incorrect interrupt has occurred	Internal error. De-energize and then energize the power to the drive.
3	NMI interrupt/bus error	Internal error. De-energize and then energize the power to the drive.
16	Errors while booting	Internal error. De-energize and then energize the power to the drive.
17	Software error	Internal error. De-energize and then energize the power to the drive.
18	Time slot configuration	Internal error. De-energize and then energize the power to the drive.
19	Time slot – time error	Internal error. De-energize and then energize the power to the drive.
20	No free memory	Internal error. De-energize and then energize the power to the drive.

Table 3-22 BMAXX 4000 Drive Faults (Continued)

Fault Number	Fault	Solution
21	Invalid error code	Internal error. De-energize and then energize the power to the drive.
22	Invalid warning code	Internal error. De-energize and then energize the power to the drive.
23	False FPGA version	Contact Husky Service.
48	Error in module A	De-energize and then energize the power to the drive, do a check of the wiring to module, or replace module (if necessary).
50	Error in module C	De-energize and then energize the power to the drive, do a check of the wiring to module, or replace module (if necessary).
51	Error in module D	De-energize and then energize the power to the drive, do a check of the wiring to module, or replace module (if necessary).
53	Error in module G	De-energize and then energize the power to the drive, do a check of the wiring to module, or replace module (if necessary).
54	Error in module H	Do a check of the module switch to see if it is in the down position. Cycle power to the drive, contact Husky Service.
64	Mains failure	Do a check of the fuses/circuit breaker, restore main power to the drive.
65	Phase failure	Do a check of the fuses/circuit breaker, restore main power to the drive.
66	Mains under voltage	Do a check of the power wiring. Measure the voltage at the drive; the phase-to-phase must be greater than 208 V. Correct a low voltage condition.
67	Mains over voltage	Do a check of the power wiring. Measure the voltage at the drive; the phase-to-phase must be less than 415 V. Correct a high voltage condition.
68	Under voltage 24 V	Do a check of the DC power supply G1 wiring. Measure the DC voltage. It must be between 20.4 V to 28.8 V. Adjust. if necessary.
81	Heat sink over temperature	Look for an obstruction of the drive heat sink fins (located out the back of the controller). There is a fan on the heat sink (bottom) that should come on before this fault occurs. If this fan turns on, let the system cool down and try again.

Table 3-22 BMAXX 4000 Drive Faults (Continued)

Fault Number	Fault	Solution
82	Reduce the DC link voltage	Plastic pressure has pushed on the stems before they reached the open position. Make sure that the injection does not occur until the stems are in the open position (do not inject while stems are opening).
83	Over current	Do a check of the cabling to motor. Cycle power to the drive. This fault can occur if there is an obstruction that was not sensed for a while.
84	Earth leakage	Do a check of the cabling between drive and motor. Do a check of the motor for earth leakage. Replace the motor, if necessary.
85	Device internal over temperature	Make sure that there are no air obstructions above or below the drive. Do a check of the heat sink fins (located out the back of the controller) for obstruction.
86	Cable break temperature sensor	Do a check to make sure that the black encoder cable is not damaged and is connected to the motor. Replace encoder cable, if necessary.
87	Safety relay off or defective	The fault can be displayed when the safety gates are opened. Do a check of the control wiring to drive (blue wires). Do a check of the to make sure that connector X102 on underside of drive is connected correctly (safety relay connector).
88	Bridge short circuit	De-energize and then energize the power to the drive. Replace the drive.
89	Power unit not ready to operate	Do a check of the control wiring to the drive (blue wires). De-energize and then energize the power to the drive.
90	Phase failure	Same as Fault 65.
91	Mains failure	Same as Fault 64.
92	Mains under voltage	Same as Fault 66.
93	Mains over voltage	Same as Fault 67.
94	U DC link under voltage	Do a check of the power connections. Replace the drive.
96	Short circuit motor temperature sensor Tm<=-30°C	Do a check to make sure that the black encoder cable is not damaged and is connected to the motor. Replace encoder module A in the drive. Replace the motor.

Table 3-22 BMAXX 4000 Drive Faults (Continued)

Fault Number	Fault	Solution
97	Temperature sensor motor not connected Tm >=+300 °C (572 °F)	Do a check to make sure that the black encoder cable is connected between motor and drive and not damaged. Replace encoder module A in the drive. Replace the motor.
98	Motor over temperature	Let the motor cool down. Increase the cycle time (cycle time should not be less than 3 sec).
99	Error I^2t > 100%	Let the motor cool down. Increase the cycle time (cycle time should not be less than 3 sec).
115	Cable break encoder 1	Do a check to make sure black encoder cable is connected between motor and drive and not damaged.
123	Field angle error	Do a check of the black encoder cable for shield damage.
146	Encoder module 1 is missing	Module A in the drive is missing or faulty. Replace, if necessary.
192	Position deviation dynamic	Motor position has exceeded its control position. Make sure that the injection does not occur until the stems are in the open position (do not inject while the stems are opening). Decrease the hold pressure.
193	Position deviation static	Motor position has exceeded its control position. Make sure that the injection does not occur until the stems are in the open position (do not inject while the stems are opening). Decrease the hold pressure.
200	Homing necessary and not yet executed	Do a calibration. De-energize and then energize the power to the drive.
208	Drive is blocked	Motor is blocked/stalled that was not sensed by obstruction detection software, or the torque limit exceeded for a prolonged period of time. Do a calibration. Check for obstruction in the valve stem actuation system. De-energize and then energize the power to the drive.

Table 3-22 BMAXX 4000 Drive Faults (Continued)

Fault Number	Fault	Solution
709	Motor Excess Temperature	Make sure that the motor feedback cable (green cable) is correctly connected to the motor and controller. If not, reconnect the cable and do a check for errors. Monitor the Motor Temperature value on the Motor Thermal Status panel on the Setup screen. If the value is greater than 100 °C (212 °F) and the motor is cold to the touch, this would be an indication that the motor temperature sensor does not match the temperature sensor type assigned in the controller. Navigate to the UltraSync-E Setup screen and look at the temperature sensor type assigned to the motor in the Temperature Sensor panel on the Hot Runner window. If it is set to KTY, change it to PT1000. If this does not fix the issue, replace the motor.
710	Motor Temperature Threshold 1 Exceeded	
711	Motor Temperature Threshold 2 Exceeded	
712	Short Circuit on Temperature Encoder	Make sure that the motor feedback cable (green cable) is correctly connected to the motor and controller. If not, reconnect the cable and do a check for errors. Navigate to the UltraSync-E Setup screen and look at temperature sensor type assigned to the motor in the Temperature Sensor panel on the Hot Runner window. If it is set to PT1000, change it to KTY. If this does not fix the issue, replace the motor.

Table 3-23 identifies the BMAXX 5000 drive faults and gives their possible solutions.

Table 3-23 BMAXX 5000 Drive Faults

Communication Faults		
Alarm Description: Drive Fault: Communication (Error Code XXXX)		
Error Code	**Fault**	**Solution**
119	Drive no longer synchronous with fieldbus	Correct the fieldbus communication alarms reported on the Human Machine Interface (HMI) screen. Do a check of the fieldbus communication cables and connections. Do a check for sources of electrical noise. Do a check for EMC problems, shielding problems, and loss of the 24 V power supply. Do a check for faulty devices on the same fieldbus as the servo drive system. De-energize and then energize the controller and if the problem continues contact Husky.
127	Timeout fieldbus interrupt	
501	Current Controller Cycle > RT0-Cycle time	
505	Fieldbus cycle time < RT0-Cycle time	
1023	Communication error with MUX register to the FPGA	
1037	Signal error during communication with the One Wire EEprom	
1937	Actual data were not picked up on time	
1938	No data is available yet	
Configuration Faults		
Alarm Description: Drive Fault: Configuration (Error Code XXXX)		
Error Code	**Fault**	**Solution**
128	Unknown identification System FPGA	De-energize and then energize the controller and if the problem continues contact Husky.
129	System FPGA version does not fit to DSP software	
130	The fallback version was booted by Bootloader 1	
131	The communication firmware has booted the fallback version	
132	The firmware has booted the fallback version	
133	The FPGA has booted the fallback version	
153	Value less minimum value	
154	Value greater maximum value	
157	Wrong axis index	
2702	Error in the configuration of the return motion	

Table 3-23 BMAXX 5000 Drive Faults (Continued)

Feedback Faults		
Alarm Description: Drive Fault: Feedback Sensor (Error Code XXXX)		
Error Code	**Fault**	**Solution**
400	Amplitude of the encoder signal too small	Do a check to make sure encoder cable is not damaged and is connected to the motor. There could also be a defect in the encoder hardware and, if so, the motor will need to be serviced.
401	Amplitude of the encoder signal too great	
402	Error while initializing the position through Sin/Cos signals.	
403	Encoder monitoring: Overspeed due to sector error	
404	Signal monitoring at square-wave incremental encoder	
405	CRC error in received data	
406	Lighting failure EnDat® interface	
407	Signal amplitude too small EnDat® interface	
408	Position error EnDat® interface	
409	Overvoltage EnDat® interface	
410	Under voltage EnDat® interface	
411	Overcurrent EnDat® interface	
412	Battery error EnDat® interface	
413	Alarm Bit set	
414	Error during reception: Address mirroring returns an error	
415	Variance of encoder signals exceeds adjustable limit	
1730	Encoder temperature critical	
1733	Position error Multi-turn	
1734	Position error Multi-turn	
1735	Position error Multi-turn	
1752	Error while initializing the encoder (multiple errors)	
1753	Position generally not dependable	
1754	Unknown error from encoder	

Table 3-23 BMAXX 5000 Drive Faults (Continued)

1800	No or invalid data in the encoder motor type plate	
1801	Invalid section found in the encoder OEM memory	(Continued)
1813	No memory available in the encoder	
Overload of Device Faults		
Alarm Description: Drive Fault: Overload (Error Code XXXX)		
Error Code	**Fault**	**Solution**
2022	Overload of the Device	Clear the error and do an analysis of the deceleration value in the motion profile and reduce if possible.
Overvoltage in Power Unit Faults		
Alarm Description: Drive Fault: Overvoltage (Error Code XXXX)		
Error Code	**Fault**	**Solution**
1002	Power unit maximum DC link voltage exceeded	Clear the error and do an analysis of the deceleration value in the motion profile and reduce if possible.
1055	DC link voltage chopper threshold (DC link voltage max-30V) exceeded	
2008	Overvoltage in DC link	
Under Voltage in Power Unit Faults		
Alarm Description: Drive Fault: Under Voltage (Error Code XXXX)		
Error Code	**Fault**	**Solution**
1019	Under voltage DC link voltage	Do a voltage check from the supply to the controller and make sure that it is in the specifications. De-energize and then energize the controller and if problem continues contact Husky.
2009	Under voltage in DC link	
Power Unit Over Temperature Faults		
Alarm Description: Drive Fault: Drive Over Temperature (Error Code XXXX)		
Error Code	**Fault**	**Solution**
1006	Power unit excess temperature	Make sure there are no air obstructions above or below the drive and that the air intake filter at the back of the unit is clear of debris or obstructions.
1020	Heat sink excess temperature	
1021	Excess temperature inside	

Table 3-23 BMAXX 5000 Drive Faults (Continued)

Safety Function Faults		
Alarm Description: Drive Fault: Drive Function (Error Code XXXX)		
Error Code	**Fault**	**Solution**
1007	Power unit safety relay	De-energize and then energize the controller and if problem continues contact Husky.
Motor Over Temperature Faults		
Alarm Description: Drive Fault: Motor Over Temperature (Error Code XXXX)		
Error Code	**Fault**	**Solution**
709	Motor excess temperature	Do a check of the area around the motor for a source of high heat. The duty cycle maybe too much. Lower the frequency of actuation, if possible. Examine the motion profile settings and use lower settings, if possible.
712	Short circuit on temperature encoder	
713	Temperature encoder is not connected	
714	Motor excess temperature PTC resistor	
Position Deviation Faults		
Alarm Description: Drive Fault: (Error Code XXXX)		
Error Code	**Fault**	**Solution**
207	Exceeded position error limit 1	Do a check for obstructions in the mechanical mechanism in the mold. Remove the obstructions, if necessary. Examine the motion profile settings and use lower settings, if possible.
208	Exceeded position error limit 2	
Velocity Deviation Faults		
Alarm Description: Drive Fault: Velocity Deviation Limit Exceeded (Error Code XXXX)		
Error Code	**Fault**	**Solution**
201	Exceeded limit pos. speed control deviation	Do a check for obstructions in the mechanical mechanism in the mold. Remove the obstructions, if necessary. Examine the motion profile settings and use lower settings, if possible.
202	Exceeded limit pos. speed control deviation	

Table 3-23 BMAXX 5000 Drive Faults (Continued)

Motor I^2t Overload Faults		
Alarm Description: Drive Fault: Motor Overload (Error Code XXXX)		
Error Code	**Fault**	**Solution**
205	Motor I^2t overload	Do a check to see if too much force is being applied when motor is at position. Adjust the relax limit setting in the Permissions screen to decrease the applied force, as necessary. Do a check for obstructions in the mechanical mechanism in the mold. Remove the obstructions, if necessary.
Motor Over Current Faults		
Alarm Description: Drive Fault: Motor Over Current (Error Code XXXX)		
Error Code	**Fault**	**Solution**
1003	Overcurrent error in the power unit	Do a check of the cabling to the motor. De-energize and then energize the power to the drive. This fault could occur if a obstruction goes undetected. for a long time The motor could be damaged and needs to be replaced.
Motor Earth Faults		
Alarm Description: Drive Fault: Motor Earth Fault (Error Code XXXX)		
Error Code	**Fault**	**Solution**
1004	Power section fault current / earth fault monitoring	The ground fault may occur in the motor, motor cable, bleeder resistor, or its feed cable. Find and replace the defective device.
Communication Warning		
Alarm Description: Drive Warning: Communication (Error Code XXXX)		
Error Code	**Fault**	**Solution**

Table 3-23 BMAXX 5000 Drive Faults (Continued)

139	Drive not synchronous with RT fieldbus (Warning)	Correct the fieldbus communication alarms reported on the HMI screen. Do a check of the fieldbus communication cables and connections. Do a check for sources of electrical noise. Do a check for EMC problems, shielding problems, and loss of the 24 V power supply.
1931	General transmission error. Client must repeat telegram (e.g. with fragmented transmissions)	
1934	Communication partner reports error number in telegram user data	
2413	The transmit process is busy	
2414	The receive process is busy	Check for faulty devices on the same fieldbus as the servo drive system. De-energize and then energize the controller and if problem persists contact Husky.
2415	Timeout of transmit process	
2416	Timeout of receive process	
Feedback Warnings		
Alarm Description: Drive Warning: (Error Code XXXX)		
Error Code	**Fault**	**Solution**
417	Warning Collision of frequency	Do a check to make sure the encoder cable is not damaged and is connected to the motor. There could also be a defect in the encoder hardware and, if so, the motor will need to be serviced.
418	Warning Excess temperature	
419	Warning lighting controller reserve reached	
420	Warning Battery load to small	
421	Warning Reference point	
203	Positive overspeed limit exceeded	
204	Negative overspeed limit exceeded	
Motor Over Temperature Warnings		
Alarm Description: Drive Warning: Motor Over Temperature (Error Code XXXX)		
Error Code	**Fault**	**Solution**
710	Motor Temperature Threshold 1 exceeded	Do a check of the area around the motor for a source of high heat. The duty cycle maybe too much. Lower the frequency of actuation, if possible. Examine the motion profile settings and use lower settings. if possible.
711	Motor Temperature Threshold 2 exceeded	
Power Unit Over Temperature Warnings		
Alarm Description: Drive Warning: Drive Over Temperature (Error Code XXXX)		
Error Code	**Fault**	**Solution**

Table 3-23 BMAXX 5000 Drive Faults (Continued)

1049	Temperature warning threshold heat sink exceeded	Make sure there are no air obstructions above or below the drive and that the air intake filter at the back of the unit is clear of debris or obstructions.
1050	Temperature warning threshold Inside Air exceeded	

3.9.2 Alarm: Position Deviation Limit Exceeded

This fault occurs when the valve stems position deviates from set position by more than the value of the Position Alarm Window setting. The alarms can be cleared, but may occur immediately or during the next valve stem movement if the problem still remains.

Possible causes for this fault include:

- Opening or Closing Force Limits are set too low
- Position Monitoring Window is set too small
- Resin in the system is too cold or the temperature zone setpoints are set too low
- A physical obstruction of the valve stem plate
- Damaged component
- Maintenance pin(s) not removed before operation (Gen1 tools only)

To troubleshoot this fault:

- Review the concurrent alarms on the alarm page or in the Event log to find when the fault occurred. Was it during opening, closing, or while holding at an end position?
- Increase the closing and opening force limits to the maximum.
- Reduce the speed, acceleration, and deceleration settings.
- Increase the Position Alarm Window setting.

3.10 Preventative Maintenance

The tasks that follow should be done on regular schedule.

Interval	Task
Each Day	Make sure that all safety devices operate correctly.
	Examine all the cables.
	Clean the UltraSync-E controller cabinet and touch screen of the display module.
	Examine the air filter area on the rear of the UltraSync-E controller.
Each Month	Examine all electrical components.

CAUTION!

Make sure that there is no blockage of the air filter cover or the air outlets. If there is not sufficient airflow then damage can occur to the UltraSync-E.

Examine the air filter (do this task more frequently if you operate the UltraSync-E where the airflow has a large quantity of contamination).

1. You must check all the safety devices on the molding cell before you start the IMM.
   a. Do a check of the emergency stop buttons.

      Push an emergency stop button.

      Make sure that all movement in the molding cell has stopped.

      Pull out the emergency stop button.

      Start the IMM.

      Do steps a) thru d) again for all the remaining emergency stop buttons.

   b. Do a check of the safety gates.

      Open a safety gate.

      Make sure that all movement in the molding cell has stopped.

      Close the safety gate and start the IMM.

      Do steps a) thru c) again for all the remaining safety gates that you can move and are interlocked.

2. Examine all the UltraSync-E controller cables for wear and damage. Replace all cables that have damage or are worn.

3. Clean the UltraSync-E and touch screen.
   a. Remove all oil grease, and other unwanted material from the cabinet of the UltraSync-E controller.
   b. De-energize the display module.
   c. With a soft lint-free cloth, remove dust and other unwanted contamination from the touch screen.

CAUTION!

Mechanical hazard - risk of equipment damage. Liquid that is sprayed or that falls onto the UltraSync-E, including oil or water, could damage the equipment. Do not spray wash.

   d. If necessary, spray a small amount of glass cleaner to make the soft lint-free cloth moist. Avoid glass cleaners with ammonia. Wipe the screen with the moist cloth.

4. If applicable, make sure that the slots of the air filter cover on the rear of the UltraSync-E do not have dust or other unwanted material.

5. If applicable to your system, examine the air filter.
   a. On the rear of the UltraSync-E cabinet, remove the screws that attach the air filter cover.
   b. Remove the air filter cover.
   c. Remove the air filter from the UltraSync-E cabinet.
   d. Examine the air filter. Make sure that it is clean and not clogged with contamination.
   e. If necessary, clean or replace the air filter.
   f. There are two different sizes of air filter.

      HPN 7113453 - pleated panel air filter (10x10x1 inch) MERV8, or equivalent.

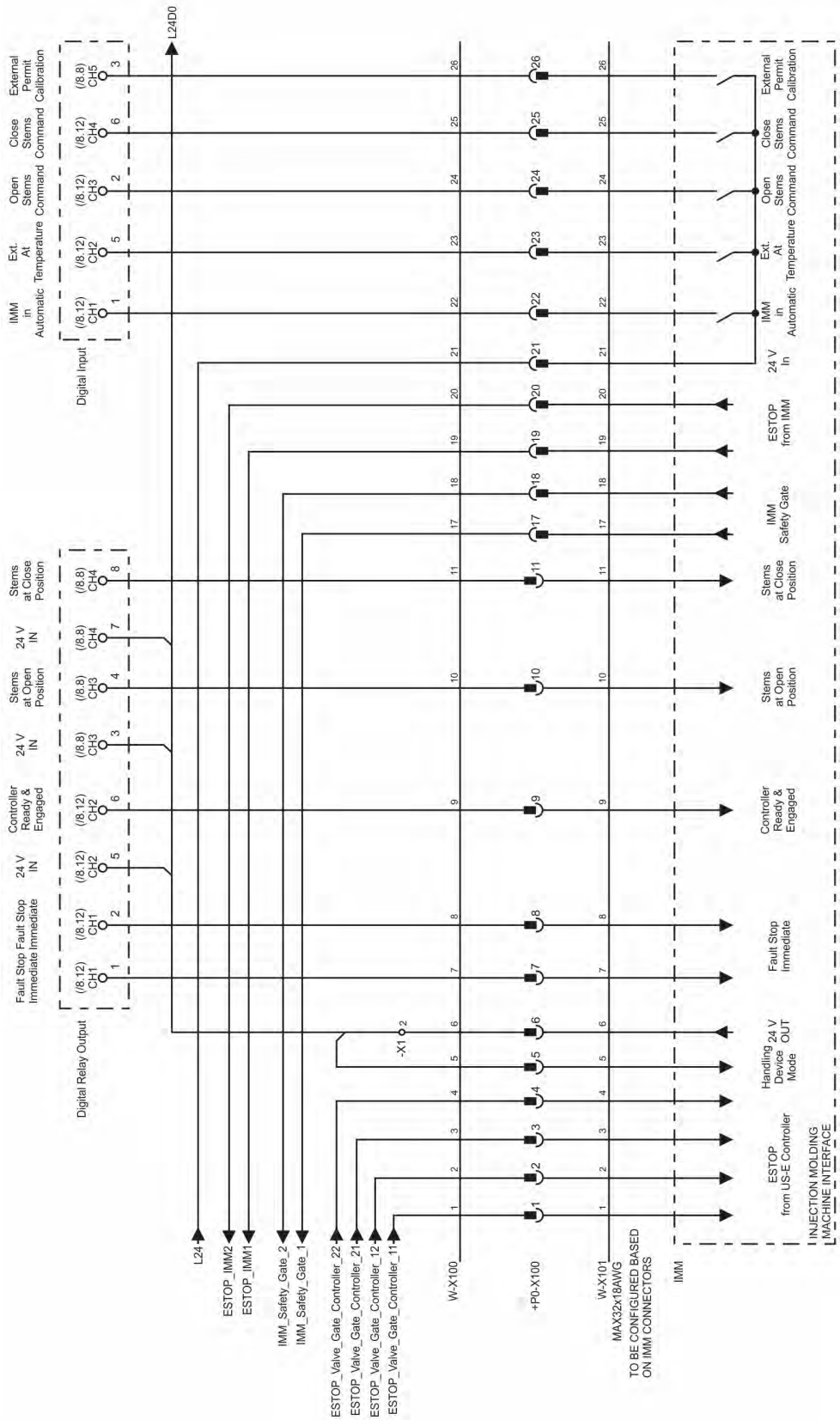
      HPN 7113472 - pleated panel air filter (7x7x1 inch) MERV8, or equivalent.

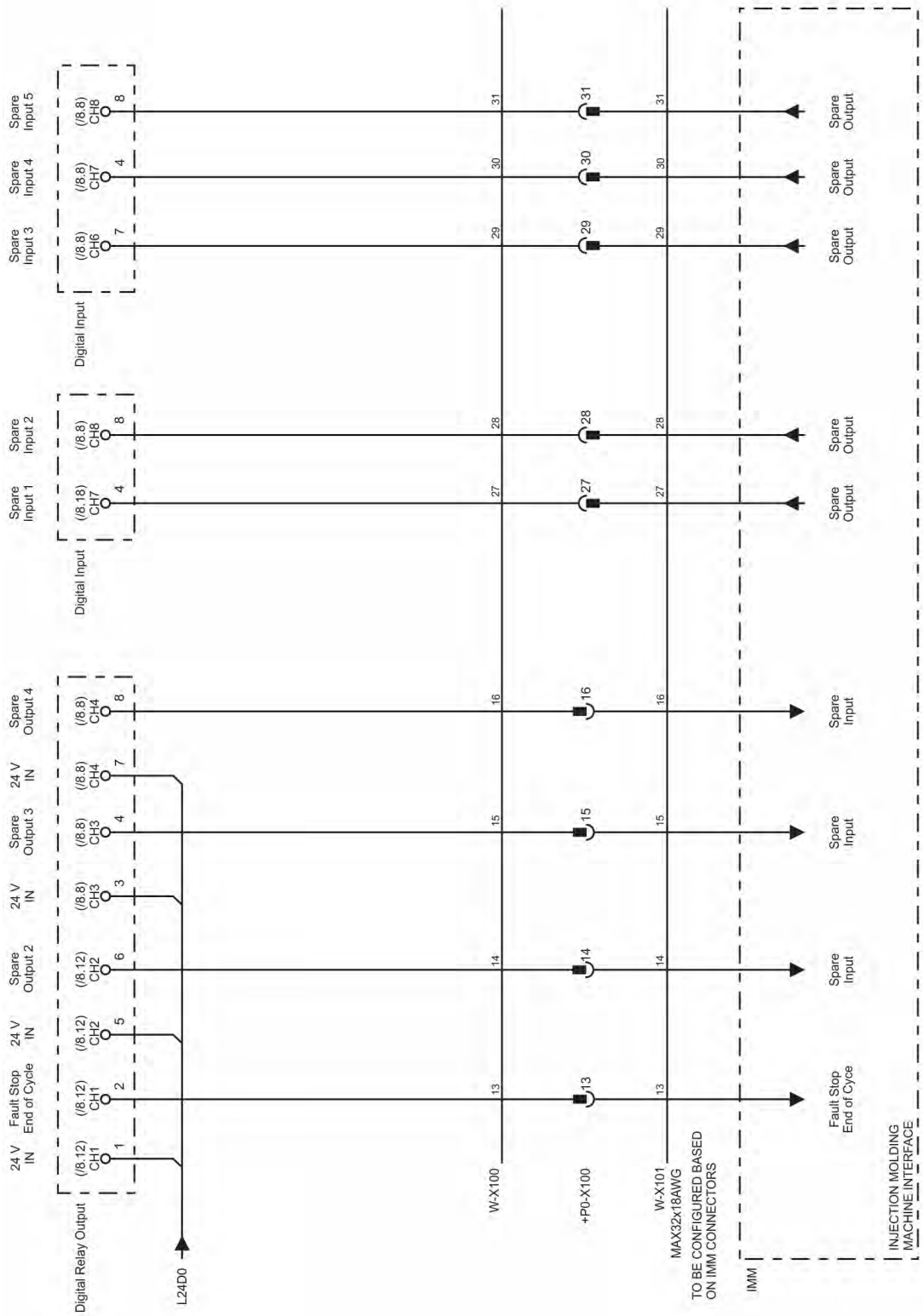
      Install the applicable air filter in the UltraSync-E cabinet.

      Install the air filter cover and attach it with the screws.

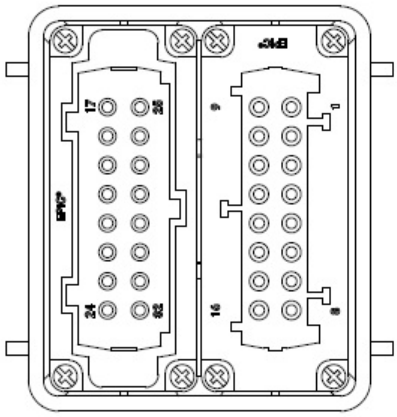
Chapter 4 Schematics

The schematics that follow show the connections from the controller to the IMM.


L24D0
Digital Input
IMM in Automatic
Ext. At Temperature
Open Stems Command
Close Stems Command
External Permit Calibration
Digital Relay Output
Fault Stop Immediate
Controller Ready & Engaged
24 V IN
Stems at Open Position
Stems at Close Position
L24
ESTOP_IMM2
ESTOP_IMM1
IMM_Safety_Gate_2
IMM_Safety_Gate_1
ESTOP_Valve_Gate_Controller_22
ESTOP_Valve_Gate_Controller_21
ESTOP_Valve_Gate_Controller_12
ESTOP_Valve_Gate_Controller_11
-X1
W-X100
+P0-X100
W-X101
MAX32x18AWG
TO BE CONFIGURED BASED
ON IMM CONNECTORS
IMM
ESTOP from US-E Controller
Handling Device Mode
24 V OUT
Fault Stop Immediate
Controller Ready & Engaged
Stems at Open Position
Stems at Close Position
IMM Safety Gate
ESTOP from IMM
24 V In
IMM in Automatic
Ext. At Temperature
Open Stems Command
Close Stems Command
External Permit Calibration
INJECTION MOLDING
MACHINE INTERFACE


Digital Relay Output
24 V IN
(/8.12) CH1
1
Fault Stop End of Cycle
(/8.12) CH1
2
24 V IN
(/8.12) CH2
5
Spare Output 2
(/8.12) CH2
6
24 V IN
(/8.8) CH3
3
Spare Output 3
(/8.8) CH3
4
24 V IN
(/8.8) CH4
7
Spare Output 4
(/8.8) CH4
8
L24D0
Digital Input
Spare Input 1
(/8.18) CH7
4
Spare Input 2
(/8.8) CH8
8
Digital Input
Spare Input 3
(/8.8) CH6
7
Spare Input 4
(/8.8) CH7
4
Spare Input 5
(/8.8) CH8
8
W-X100
13
14
15
16
27
28
29
30
31
+P0-X100
13
14
15
16
27
28
29
30
31
W-X101
MAX32x18AWG
TO BE CONFIGURED BASED
ON IMM CONNECTORS
13
14
15
16
27
28
29
30
31
IMM
Fault Stop End of Cyce
Spare Input
Spare Input
Spare Input
Spare Output
Spare Output
Spare Output
Spare Output
Spare Output
INJECTION MOLDING
MACHINE INTERFACE

X100 Cable with Flying Leads from the Controller to the IMM



Connector	Pin #	Wire Strip (mm)	Termination	Wire Number
Hood	1	3	Ferrule	1
	2	3	Ferrule	2
	3	3	Ferrule	3
	4	3	Ferrule	4
	5	3	Ferrule	5
	6	3	Ferrule	6
	7	3	Ferrule	7
	8	3	Ferrule	8
	9	3	Ferrule	9
	10	3	Ferrule	10
	11	3	Ferrule	11
	12	3	Ferrule	12
	13	3	Ferrule	13
	14	3	Ferrule	14
	15	3	Ferrule	15
	16	3	Ferrule	16
	17	3	Ferrule	17
	18	3	Ferrule	18
	19	3	Ferrule	19
	20	3	Ferrule	20
	21	3	Ferrule	21
	22	3	Ferrule	22
	23	3	Ferrule	23
	24	3	Ferrule	24
	25	3	Ferrule	25
	26	3	Ferrule	26
	27	3	Ferrule	27
	28	3	Ferrule	28
	29	3	Ferrule	29
	30	3	Ferrule	30
	31	3	Ferrule	31
	32	3	Ferrule	32
	33	-	spare	33
	G/Y	3	terminal ring 1/4" stud	G/Y