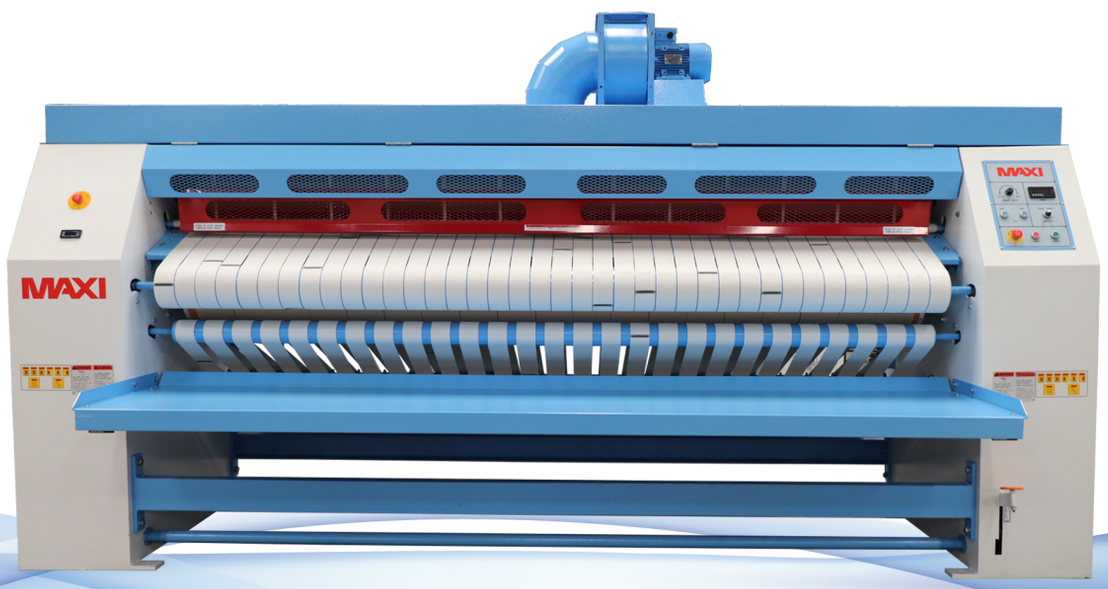
Heated Roll Heavy Duty Flatwork

Instruction Manual

Model

MFIS-24120/S
Steam



IM2207-IS0802-02
MAXI COMPANIES, Inc. 4317 East Genesee Street. Dewitt, New York 13214 USA Tel. (315)446-1002, Fax. (315)446-2431 E-mail: sales@maxico.com

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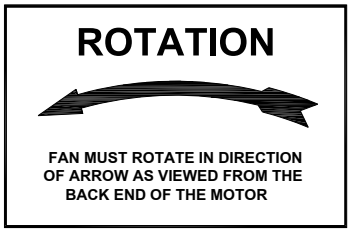
KEY SYMBOLS

Anyone operating or servicing this machine must follow the safety rules in this manual. Particular attention must be paid to the DANGER, and WARING, and CAUTION blocks which appear throughout the manual.

Symbols	Description
	**The lightening flash and arrowhead within the triangle is a warning sign alerting you of the presence of dangerous voltage.**
	**DANGER! For the hand, It can be caught in moving roller or Narrow spaces.**
	**This warning symbol indicated the presence of hot surfaces that could cause serious burns. Stainless steel and steam lines can become extremely got and should not be touched.**
	**Curtain slippery surface tread carefully.**
	**Push hears for emergency stop.**
	**DANGER! For the hand, It can be caught in moving Roller or Narrow spaces.**

Symbols	Description
	**DANGER! For the hand, Belts and pulley in motion. Do Not operate with out Guard.**
	**STOP – Read manual first.**
	**DANGER! High voltage present.**
	**Information, Alert to the correct direction of rotation.**
	**STOP – Danger moving parts, Read manual.**
	**WARNING! Hot Surface, Do not touch surface. Contact with hot surface can result in serious bodily injury.**
	**DANGER! For the hand, Belts and pulley in Not operate with out Guard.**

SECTION 1

IMPORTANT INFORMATION

This manual contains installation, operation, maintenance, and instructions. Trouble shooting and illustrated parts lists for the High-Performance Ironers:

Please read and understand this/ manual before attempting the installation or operation of the Ironers. Should you require any additional information that may not be included in this manual, please do not hesitate to call your nearest dealer or service department.

This manual contains valuable information for you; therefore keep it in an easily accessible and safe place.

A. SAFETY INFORMATION

1. Read all instructions prior to operating this equipment.
2. Ensure that the equipment is properly grounded before applying power and operation commences.
3. Do not process goods that have been previously cleaned in, soaked in, or exposed to gasoline, dry cleaning chemicals, or any other flammable or explosive materials, as they could catch fire or explode without warning, even after being washed.
4. Do not allow children to play in or around or operate this equipment.
5. Check the operation of all safety interlocks at the start of every shift. If the interlocks do not stop the equipment immediately, the machine must be removed from service. Notify your immediate supervisor, and do not operate the machine.
6. Never attempt to service the machine while it is running. Never reach over, under, around, or behind any safety device, or into any area near moving parts or hot surfaces without shutting off power and allowing the machine to adequately cool.
7. Never attempt to remove jammed or misfed goods while the machine is in operation. Attempting to clear jammed goods while the machine is in operation can cause the user to be pulled into the machine, causing serious injury or death. Always stop the machine, remove power, and allow time for cooling before attempting to remove jammed goods.
8. Read, understand, and follow all safety instructions. Do not come close to moving parts and hot surfaces. Do not wear loose clothing, jewelry, neckties, or any other garment that could be come caught in the machine while operating or near the machine.
9. Only a qualified technician should attempt to service or repair the ironer.
10. Do not install the machine in an area where it could be exposed to water or weather.
11. Do not alter or tamper with the control system.
12. To reduce the risk of fire, do not process plastics or articles containing foam rubber or similarly textured rubber-like materials.
13. Keep the area near the exhaust ducting clean and free of lint, dust, dirt or debris.
14. Keep the interior and exterior of the machine clean of lint, dirt, dust and debris. The interior of the machine, along with the exhaust ductwork should be periodically inspected and cleaned to avoid potential fires (lint is highly flammable).

15. Improper installation, operation and maintenance of this machine can cause exposure to substances in the fuel or from combustion that can cause serious illness or death.
16. Always disconnect the electrical service from the machine and allow it to cool before performing service.
17. This machine must be installed according to the installation instructions. All electrical connections, and gas or steam connections must comply with state and local codes and must be made by a licensed installer where required.

SUBJECT TO CHANGES WITHOUT NOTIFICATION

B. SCOPE OF DELIVERY

1. Standard Equipment

The ironer is delivered in ready-to-connect modules. The supply and return lines for all utilities such as heat, compressed air, power, exhaust, etc., have to be installed by the user. Each module is covered with a protective plastic wrapping. The cover panels are normally mounted to the ironer module.

2. Technical Specifications

General information on connection loads and energy consumption depend on the heating system, the kind of works, the working speed and the kind of padding used.

For specific information, please refer to the enclosed individual installation drawing.

C. PRODUCT DESCRIPTION

1. Design And Construction

The heavy-duty ironers are manufactured in modules. The modules can be combined into ironers of one to four units with diameters of 355 - 813 mm (14 - 32 in.) Standard Widths: 3048 mm (120 in.)

2. Heating System

The ironers can be ordered for the following heating systems:

- High pressure steam
- Electric heating
- Gas

3. Control Panels

The left control panel includes emergency stop button, switch for “START”, and switch for “STOP”, speed selector**,** pilot light for overload, pilot light for main power, jog button (reverse)

The right control panel includes emergency stop button roller temperature, pilot light for heating.

D. IN CASE OF DETERIORATION PRODUCTS

1. The defective products or parts can be sold to increase the financial value.
2. The defective products able to separate into parts and bring the materials which can convert into new functional products.
3. The defective products can be reused by repairing and making the products is in good condition.

SECTION 2

SPECIFICATIONS / COMPONENT IDENTIFICATION

A. TECHNICAL SPECIFICATION

MODEL			14120	18120	24120	32120
Units of measurement	**Matric**	**US**	1	1	1	1
Number of Rolls	Roll					
Roller Diameter	mm.	inch	356 (14”)	457 (18”)	610 (24”)	813 (32”)
Working Width	mm.	inch	3000 (118")	3000 (118”)	3000 (118”)	3000 (118”)
Speed Range	M/min	Ft/min	2.5-11 (8-36)	2.5-14 (8-45)	3.75-22 (12-72)	4.5-30 (15-98)
Overall Dimensions:						
A - Machine Width	mm.	Inch	4060 (159.8”)	4060 (159.8”)	4060 (159.8”)	4060 (159.8”)
B - Machine Depth	mm.	Inch	826 (32.5)	855 (33.7")	1156 (45.5")	1587 (62.5")
C - Machine Height at full	mm.	Inch	2213 (87.1")	2418 (95.2")	2443 (96.2")	2621 (103.2")
D - Canopy Height	mm.	Inch	380 (14.9")	500 (19.7")	500 (19.7")	500 (19.7")
Drive System:						
Drive Motor	kW	HP	0.75 (1)	0.75 (1)	0.75 (1)	0.75 (1)
Delivery Motor	kW	HP	0.25 (0.33)	0.25 (0.33)	0.25 (0.33)	0.25 (0.33)
Blower Motor	kW	HP	1.5 (2)	1.5 (2)	1.5 (2)	1.5 (2)
Power System:						
Power Source	V / Hz / Ph		220/380/415 V / 50 Hz / 3 Ph 208-220/440/460 V / 60 Hz / 3 Ph			
Compressed Air system:						
Air Flow	Cmm	Cfm	31 (1080)	50 (1765)	50 (1765)	50 (1765)
Exhaust Duct	mm.	Inch	229(9)	254 (10)	254 (10)	254 (10)
Gas Model:						
Gas Inlet Connection	NPT		1/2"	1"	1"	1"
Gas Consumption	kcal/hr	btu/hr	65519 (260000)	71713 (284580)	156237 (620000)	207897 (825000)
Net Weight	kg.	lbs.	1450 (3197)	1730 (3814)	2532 (5582)	2990 (6592)
Domestic Shipping Weight(approx.)	kg.	lbs.	1574 (3470)	1865 (4112)	2667 (5880)	3125 (6889)
Steam Model:						
Steam Inlet Connection	NPT		3/4"	3/4"	1-1/4"	1-1/4"
Steam Outlet Connection			1/2"	1/2"	3/4"	3/4"
Steam Pressure	bar	psi	6.2-8.6 (90-125)	6.2-8.6 (90-125)	6.2-8.6 (90-125)	6.2-8.6 (90-125)
Steam Consumption	kg/hr	lb/hr	59.47 (131.1)	68.86 (151.8)	93.9 (207)	125.2 (276)
Net Weight	kg.	lbs.	1519 (3349)	1783 (3931)	2585 (5699)	2905 (6404)
Domestic Shipping Weight(approx.)	kg.	lbs.	1643 (3622)	1917 (4226)	2720 (5997)	3040 (6702)
Electric Heated Model:						
Electrical Heating Power	kW		24	36	48	72
Net Weight	kg.	lbs.	1585 (3494)	1843 (4063)	2645 (5831)	2930 (6460)
Domestic Shipping Weight(approx.)	kg.	lbs.	1709 (3768)	1973 (4350)	2780 (6129)	3060 (6746)

Specification and design is subject to change without notice. For additional options please consult factory and distributor.

B. TECHNICAL DIMENSION

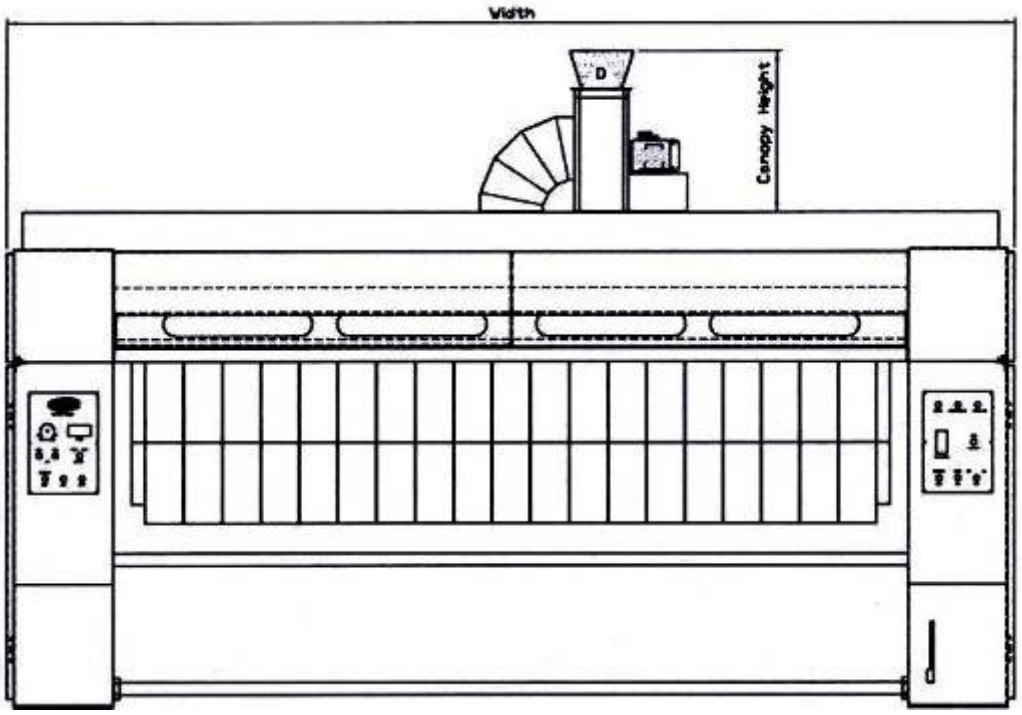


Figure.2-1 Front View Dimension

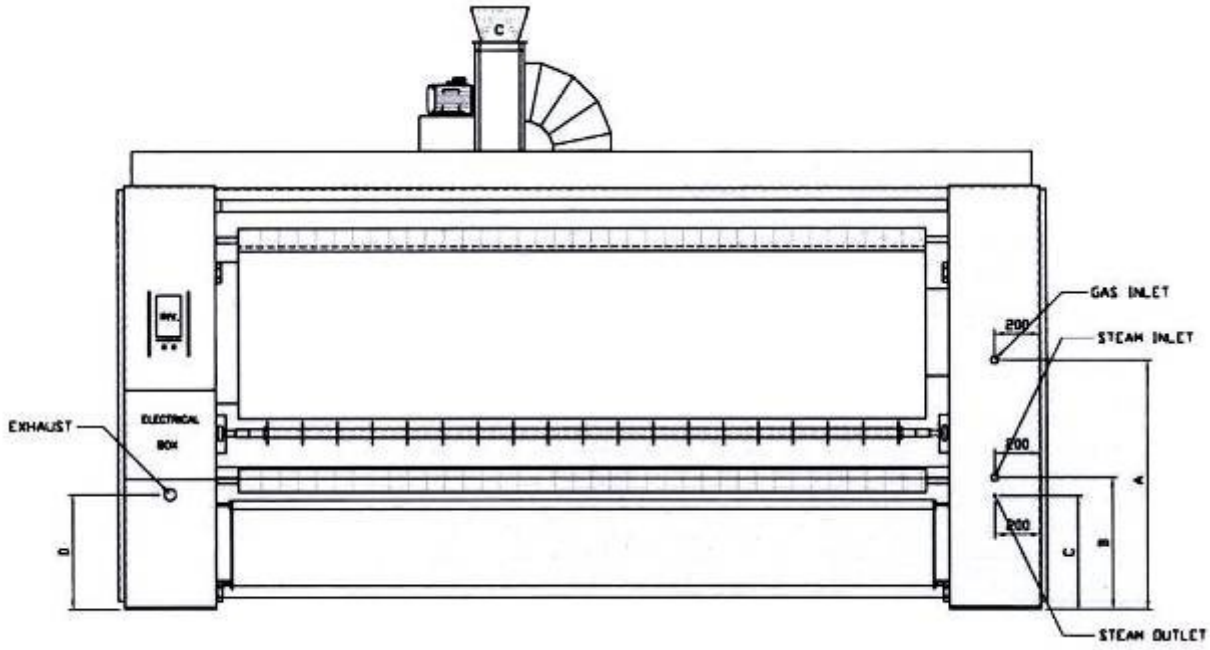


Figure.2-2 Rear View Dimension

SECTION 3

INSTALLATION PROCEDURES

A. GENERAL INFORMATION

Notice Signs

You will find notice signs throughout this manual to emphasize important and critical situations. These notice signs will help installing and operating the equipment properly, thus avoiding possible hazards and damage to the equipment. Please follow the instructions mentioned carefully to obtain safe and efficient operating equipment.

Required Personnel and Information

The installation of the ironer is usually done by the manufacturer's technicians or a qualified independent technician.

NOTE: Do not attempt to install the ironer unless you are trained and authorized to do so.

The following manual and drawings should be on site before any installation work starts:

1. Installation drawing
2. Connection diagram
3. Electrical diagram
4. Operating manual and spare parts list

B. MOVING AND SET UP

Unpacking the Ironer

The ironer is shipped in different packages with an outer plastic wrapping to protect all visible parts from shipping damage. Remove all plastic wrapping and any other packing material that may interfere with the installation.

Receiving Inspection

When receiving the ironer an inspection should be carried out and the carrier should be notified if there are any damages or signs of possible damages. The carrier must then note the damages on the delivery documents for insurance purposes. Should damages be discovered later, the carrier should also be notified immediately and a damage assessor should estimate the damages?

If any parts listed on the packing list are missing in the shipment, a claim should be filed with the carrier.

NOTE: Do not install ironer if there are any electrical or structural damages.

Moving the Ironer to Location

a) General

The ironer can be moved by using a fork lift or a crane with an appropriate sling system. The weight of the ironer can be found in the technical data of the ironer.

b) Using a Fork Lift

NOTE: The fork lift used must have the required capacity and be fitted with appropriate

Forks

The ironer can be picked up at the I-Beams at the front side. If using a lift truck, then one side of the ironer is to be lifted and skid rollers are to be used for the opposite side. Lift the ironer and move it slowly to its destination. The passage of the load should be clear of any obstruction on the floor or overhead, such as power lines, ceiling beams and others.

c) Using a Crane

The transport brackets must be in position before attempting to move the ironer with a crane.

NOTE: The crane used must have the required capacity and be fitted with appropriate slings and a spreader frame.

The ironer is to be moved in a horizontal position only. After the ironer is in position, remove the transport brackets before mounting the ironer together.

C. UTILITIES REQUIRED FOR INSTALLATION

Connecting the Ironer

a) Electrical Connection

The supplied wiring diagram and the name plate, located on the left side in the control cabinet, include the data required to connect the ironer to the main power.

NOTE: Do not connect the ironer unless you are trained and authorized to do so. Check the voltage and the breaker size before connecting the power lines.

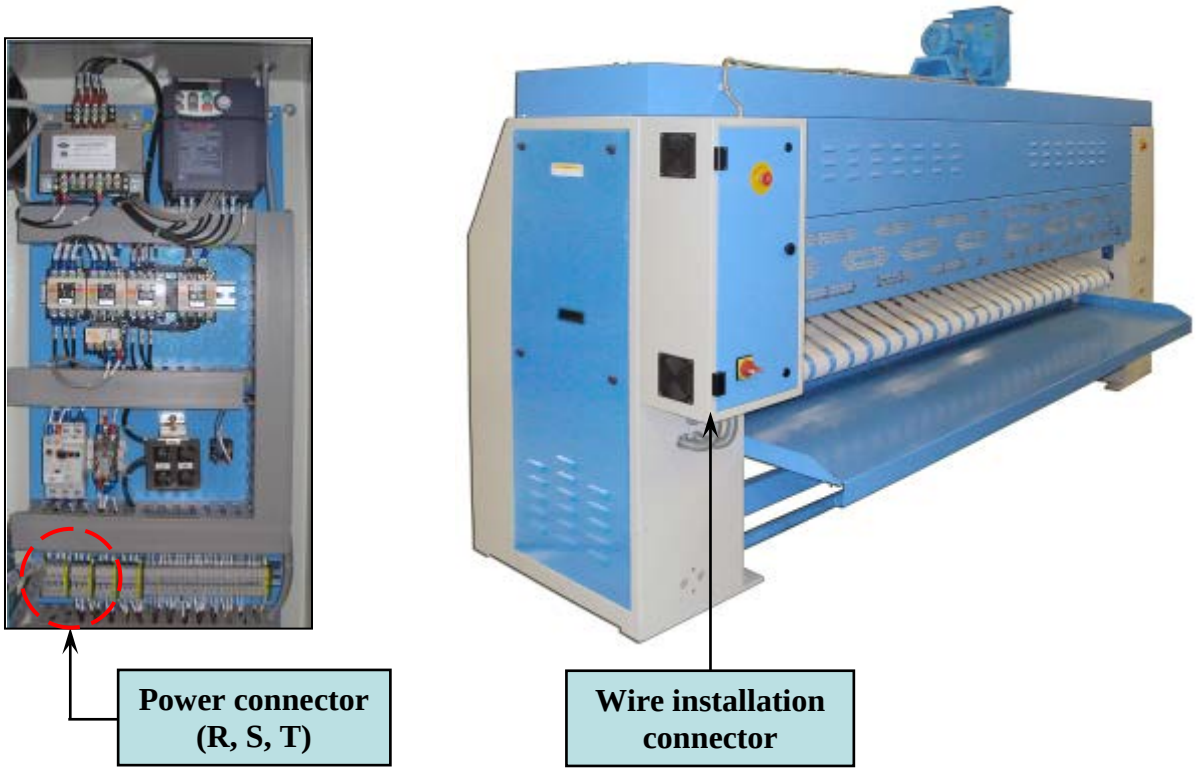


Figure.3-1 Electrical Connection

1. 1478, 14120, 14130 Electrical Service Specifications

Electrical Service Specifications (Per Ironer)

NOTES: A. 1 HP Roller motor, 1 HP Blower motor, 24 kW for electric heating model
B. Circuit breakers are thermal magnetic (industrial) type **ONLY**. For others, calculate / verify correct breaker size according to appliance amp draw rating and type of breaker used.
C. Circuit breakers for 3∅ Ironer **must be** 3-pole type.
D. 24 Kw for Electric heater type

SERVICE VOLTAGE	PHASE	WIRE SERVICE	MAXIMUM AMP.		MINIMUM WIRE SIZE*		CIRCUIT BREAKER	
			Gas, Steam	Electric	Gas, Steam	Electric	Gas, Steam	Electric
208-220	3∅	3/4	8.2	71.2	2.5mm^2/14AWG	35mm^2/2AWG	15	100
380-415	3∅	3/4	4.7	41.7	2.5mm^2/14AWG	16mm^2/6AWG	15	60

2. 18120, 18130 Electrical Service Specifications

Electrical Service Specifications (Per Ironer)

NOTES: A. 1 HP Roller motor, 2 HP Blower motor
B. Circuit breakers are thermal magnetic (industrial) type **ONLY**. For others, calculate / verify correct breaker size according to appliance amp draw rating and type of breaker used.
C. Circuit breakers for 3∅ Ironer **must be** 3-pole type.
D. 36 Kw for Electric heater type

SERVICE VOLTAGE	PHASE	WIRE SERVICE	MAXIMUM AMP.		MINIMUM WIRE SIZE*		CIRCUIT BREAKER	
			Gas, Steam	Electric	Gas, Steam	Electric	Gas, Steam	Electric
208-220	3∅	3/4	15.2	-	2.5mm^2/14AWG	-	20	-
380-415	3∅	3/4	8.7	65.4	2.5mm^2/14AWG	25mm^2/4AWG	15	75

3. 24120, 24130 Electrical Service Specifications

Electrical Service Specifications (Per Ironer)

NOTES: A. 1.5 HP Roller motor, 2 HP Blower motor
B. Circuit breakers are thermal magnetic (industrial) type **ONLY**. For others, calculate / verify correct breaker size according to appliance amp draw rating and type of breaker used.
C. Circuit breakers for 3∅ Ironer **must be** 3-pole type.
D. 48 Kw for Electric heater type

SERVICE VOLTAGE	PHASE	WIRE SERVICE	MAXIMUM AMP.		MINIMUM WIRE SIZE*		CIRCUIT BREAKER	
			Gas, Steam	Electric	Gas, Steam	Electric	Gas, Steam	Electric
208-220	3∅	3/4	20.0	-	4.0mm^2/12AWG	-	25	-
380-415	3∅	3/4	10.9	81.9	2.5mm^2/14AWG	35mm^2/2AWG	15	100

4. 32120, 32130 Electrical Service Specifications

Electrical Service Specifications (Per Ironer)								
NOTES: A. 3 HP Roller motor, 2 HP Blower motor B. Circuit breakers are thermal magnetic (industrial) type **ONLY**. For others, calculate / verify correct breaker size according to appliance amp draw rating and type of breaker used. C. Circuit breakers for 3∅ Ironer **must be** 3-pole type.								
SERVICE VOLTAGE	**PHASE**	**WIRE SERVICE**	**MAXIMUM AMP.**		**MINIMUM WIRE SIZE***		**CIRCUIT BREAKER**	
			Gas, Steam	**Electric**	**Gas, Steam**	**Electric**	**Gas, Steam**	**Electric**
208-220	3∅	3/4	16	-	4mm^2/12AWG	35mm^2/2AWG	20	-
380-415	3∅	3/4	9.2	125	2.5mm^2/14AWG	25mm^2/4AWG	15	150

* AWG Stranded Type Wire...for individual lengths longer than 100 feet.

Figure.3-2 Table For Electrical Service Specifications

1. Connect the three phase power lines to the terminals at the main circuit breaker located in the electrical enclosure.
2. Connect the power plug for the main motor drive and motor blower located in the side panel enclosure. Illustrator.
3. Install a ground wire (16 mm^2) to the bus bar and test its effectiveness.
4. Check the rotating direction of the rollers and the feeding belt, correct if necessary by rotating the incoming phases.

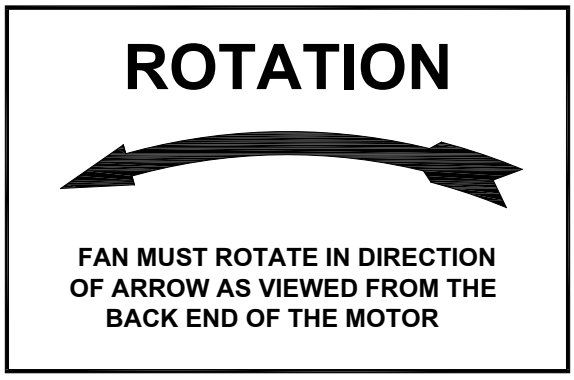


Figure.3-3 Rotation Direction Of Exhaust Blower

b) Steam Connection (For Steam Model)

For best results, operate with a steam pressure of 90-125 psi (6.2-8.6 bar). The steam inlet and return are located on the right rear of the machine. The inlet is marked as such and is 3/4" for 14120 and 18120, 18130 1-1/4" for 24120 and 32120 NPT (Female). The return is marked as such and is 1/2" for 14120 and 18120, 3/4" for 24120 and 32120 NPT (Female).

IMPORTANT: Insulate all steam and return lines for the safety of the operator and service technician.

IMPORTANT: All steam components must be rated for a minimum of 200 psi (14 bar) working pressure. Shut off valves must be installed upstream of the steam inlet, and downstream of the steam trap so that the equipment can be isolated for maintenance or emergency.

IMPORTANT: Support all steam lines and components to minimize the load on the steam

connections to the ironer.

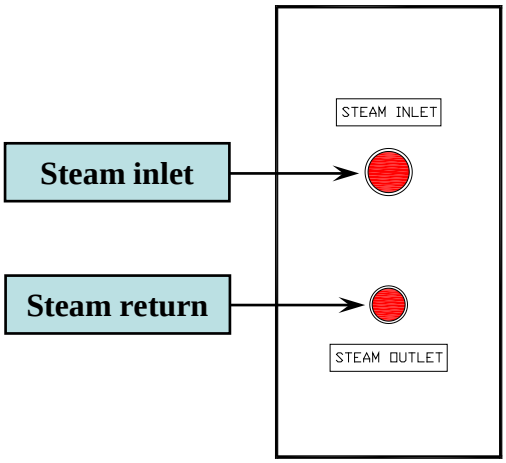


Figure.3-4 Steam Connection

Obtain steam service piping from a steam system supplier or a qualified steam fitter.

Use a minimum of 12 inch (300mm) rise above the header to prevent condensate from draining into the ironer. Do not make a steam connection to the header with a horizontal/downward facing tee or elbow.

Wherever possible, horizontal runs of steam lines must gravity drain to the steam header. Water pockets or improperly drained headers will yield poor results due to wet steam. Install a union and valve in the steam supply and return lines for ease of service.

Install an inverted bucket trap with strainer and a check valve. For best results, install the trap at least 18 inches (450mm) below the inlet and as close to the machine as possible. Install the trap according to the instructions with the unit, noting the steam flow direction. If the steam is gravity returned to the boiler, install a vacuum breaker and check valve in the return line near the machine.

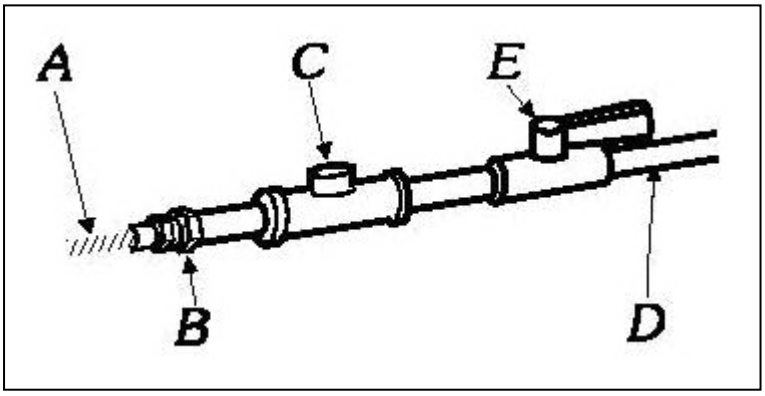
NOTE: That all return plumbing must be below the return inlet.

To prevent eventual water hammer, route all return lines below steam outlets.

c) Gas Connection (For Gas Model)
Gas Supply Line

- ¾" IPS pipe is recommended.
- ¾” approved tubing is acceptable for lengths under 25 ft (6.1 m) if local codes and gas supplier permit.
- Must include 1/8” NPT minimum plugged tapping accessible for test gauge connection, immediately upstream of the gas connection to the Ironer (see illustration).
- Must include a shutoff valve:

An individual manual shutoff valve must be installed within 6 feet (1.8m) of the equipment in accordance with the National Fuel Gas Code, ANSI Z223.1. The location should be easy to reach for opening and closing.



A. ½" flexible gas connector
B. ¾" pipe to flare adapter fitting
C. 1/8" NPT plugged tapping
D. ¾" NPT gas supply line
E. Gas shutoff valve

Figure.3-3 Gas Supply Line

IMPORTANT: Pipe joint compounds that resist the action of natural and L.P gases **must be** used.
IMPORTANT: Test all connections for leaks by brushing on a soapy water solution (liquid detergent works well).
WARNING: **NEVER** test for leaks with a flame.
IMPORTANT: The Ironer and its individual shut-off valve **must be** disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 1/2 psig (3.5 kPa).
NOTE: The Ironer **must be** isolated from the gas supply piping system by closing its individual manual shut off valve during any pressure testing of the gas supply piping system at test pressures equal to or less than 1/2 psig (3.5 kPa).

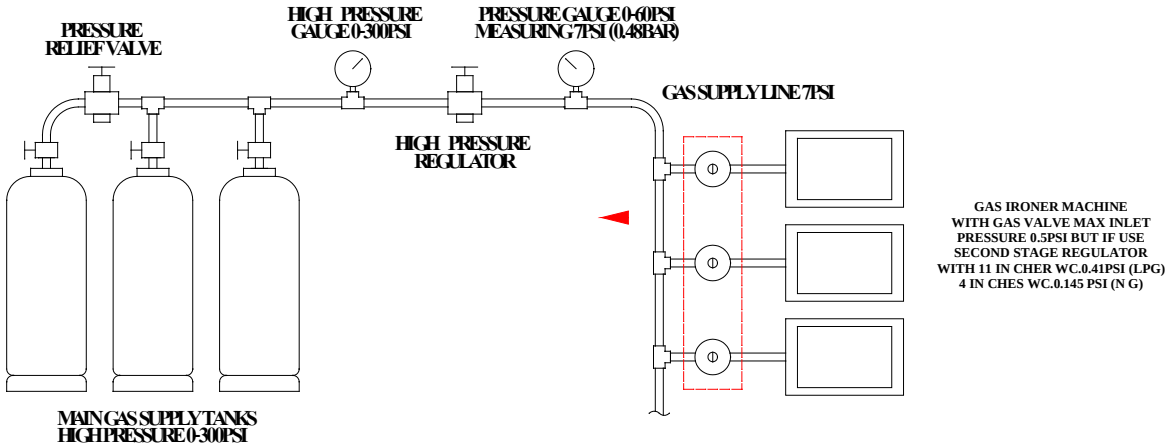


Figure.3-6 Typical of Gas Installation

Gas Supply Connection Requirements

There are many methods by which the IS series Ironer can be connected to the gas supply. Following are some guidelines for methods of connection.

Option 1:

Flexible stainless steel gas connector:

If local codes permit, use a new flexible stainless steel connector (Design certified by the American Gas Association or CSA International) to connect between the ironer and the gas supply line. Use an elbow and a ½" flare x ¾" NPT adapter fitting between the stainless steel gas connector and the gas inlet of the machine as needed to prevent kinking.

Option 2:

Other approved piping:

- Lengths under 25 feet (6.1m) use ¾" approved tubing.
- Lengths over 25 feet (6.1m) should use larger piping.
- Pipe joint compounds that resist the action of gas must be used. DO NOT USE TEFLON®/PTFE TAPE.

IMPORTANT: Be certain the ironer is configured for the type of gas being used. The gas type is shown on the serial sticker on the electrical panel of the unit.

Manifold Pressure

Be sure to check the manifold pressure. Use a manometer to verify that the manifold pressure matches the information on the serial sticker and the type of gas being used. A separate gas regulator (locally obtained) must be installed if the incoming line pressure is greater than 12 inches water column pressure.

1. Connect the manometer to the pressure connection on the gas valve (disconnect gas service).
2. Restore gas service, and determine the pressure while the burner is ignited. The pressure must match the indicated manifold pressure on the serial sticker.

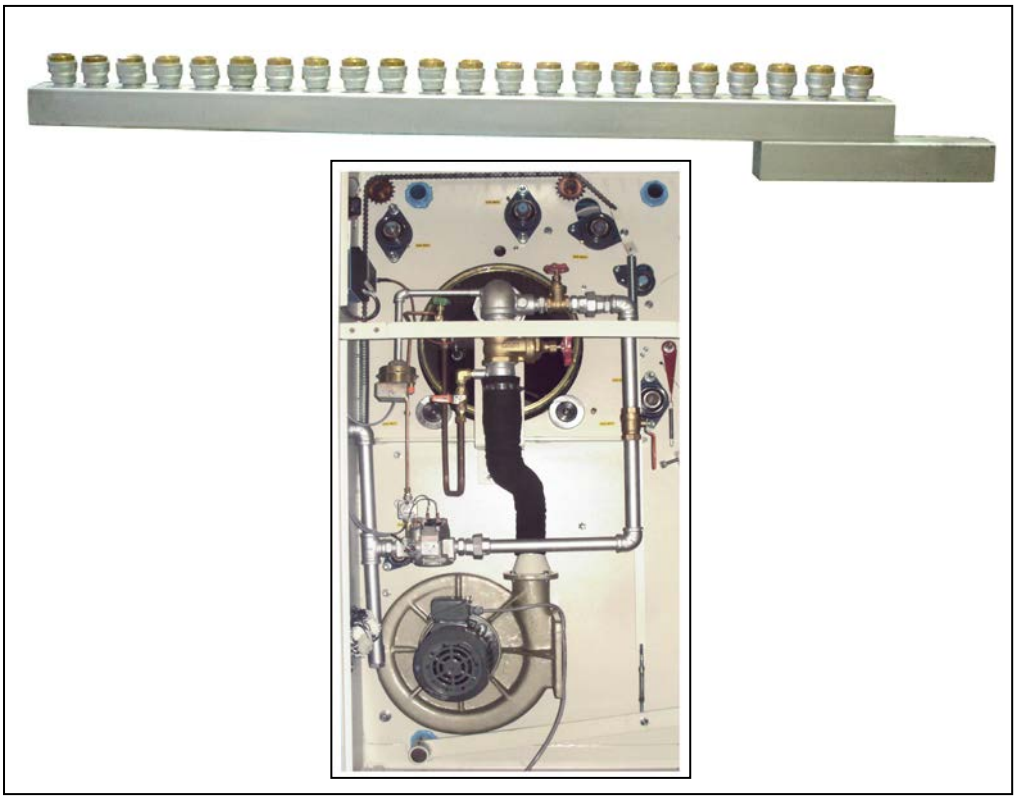


Figure.3-4 Gas Burner

Gas Conversion

NOTE: Do not connect a machine configured for Natural Gas to LP gas service or vice-versa without a qualified service technician doing a proper conversion. The correct regulator kit must be installed in the gas valve and all gas nozzles internally must be changed. See figure below.

After the reconfiguration is complete, the manifold pressure must be verified for proper operation. All instructions supplied with the regulator kit must be followed to ensure proper operation.

Technical Gas Data

Description	Type of Gas	
	Natural (NG)	Liquid Propane (LPG)
Manifold Pressure	3.5 - 4.0 inches H_2O.	10.5 - 11.0 inches H_2O.
Inline Pressure	4.5 - 14.0 inches H_2O.	12.0-14.0 inches H_2O.
Drill Nozzle Size (Hole)	3 mm.	2 mm.

* Measured at gas valve pressure tap when the gas valve is on.

Figure.3-8 Table For Technical Gas Data.

D. EXHAUST CONNECTION

For best results, install the ironer near an outside wall in order to keep the exhaust duct length as short as possible, and to provide a source of make-up air. Neither the rear nor the sides of the ironer should block. Blocking the air inlets prevents proper combustion, and will yield poor results, and possibly harmful combustion byproducts.

IMPORTANT: Do not interrupt the flow of make-up air or the exhaust!

The exhaust outlet is 8 inches in diameter (203.2mm). Use the shortest possible path with the fewest number of bends to connect to the outlet ductwork. Measured backpressure should not exceed 0.3 inches of water column pressure for reliable ignition and best results.

IMPORTANT: Under no circumstance should this ductwork be shared with other equipment.
NOTE: Check for proper exhaust fan rotation direction before placing the equipment into service. If the rotation is incorrect, remover power from the machine and exchange any two incoming power leads.

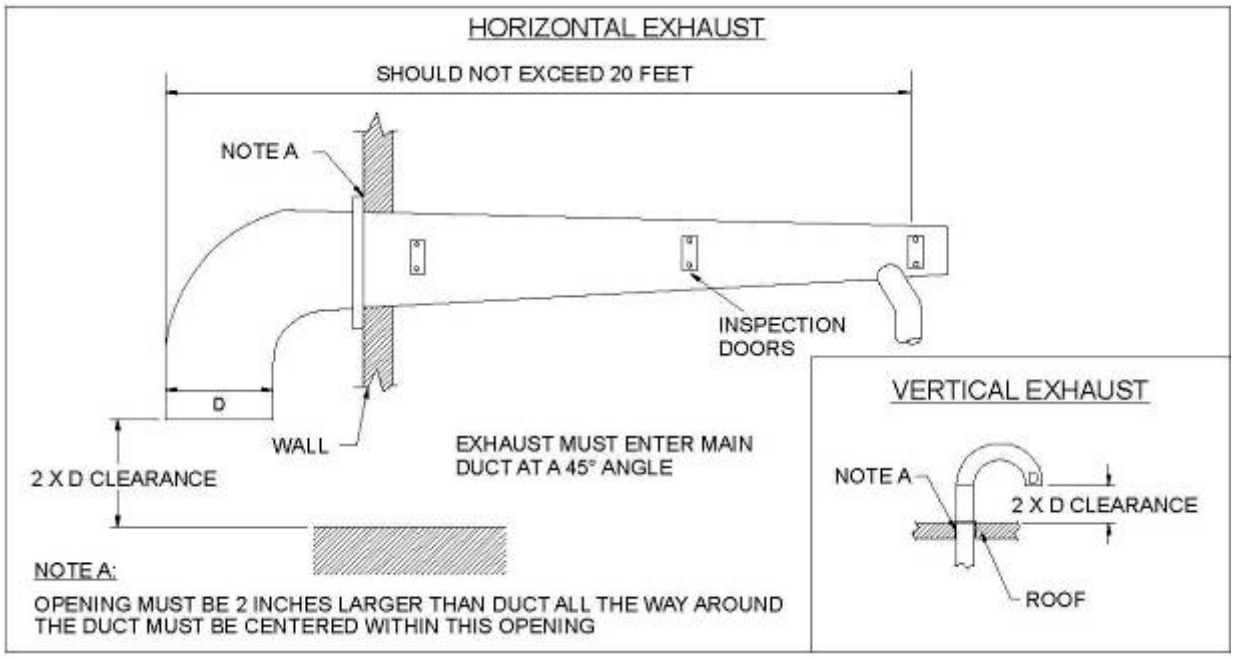


Figure.3-6 Exhaust Duct Installation

SECTION 4

OPERATING INSTRUCTIONS

A. CHECK BEFORE OPERATION

Before operation the ironer, check the following:

1. Check that the machine is level and in a stable position on the floor. The machine should not rock or move in any way.

2. Ensure that all electrical, gas/steam, and exhaust connections are made and leak free.

3. Check that the ironer is correctly grounded according to the earlier listed specifications

4. Remove all packaging and protective shipping materials. Discard these items do not store them near the ironer.

5. Inspect the thermostat sled assembly and make sure it is in full contact with the ironing cylinder, and is free of lint and debris.

6. Turn the heating control to the OFF position, and the speed control to minimum (fully counter-clockwise).

7. Apply power to the machine. Before doing this, double check that the supply voltage matches the information on the serial sticker of the ironer.

8. Press the green START button.

9. Double check that the exhaust fan is rotating in the direction indicated on the blower housing. Additional information can be found

10. Make sure the feeding belts are acting to pull linen into the machine (belts traveling towards the heated cylinder)

11. Replace all panels.

12. For gas units, move the heat switch to the ON position. The heat light turns on. There will be a delay of 30 seconds prior to ignition.

13. Check that the temperature increases. When the temperature reaches the set point, the heat light should turn off.

14. Use old or worn linen to perform the initial ironing test.

15. Lay the linen on the feeding belts and allow it to be pulled into the ironer.

16. Adjust the speed control so that the goods come out of the ironer dry and finely pressed.

NOTE: Do not perform maintenance on this machine while it is running, the cylinder is hot, or while the machine's circuit breaker is on.

B. PRIOR TO STARTING

Prior to starting the first shift of the day:

1. Inspect the area between the thermostat sled and the ironing cylinder. Gently lift the pick up sled away from the cylinder.

2. Clean any debris found away from the pick up sled and cylinder.

3. Ensure that the pick up sled remains in contact with the ironing cylinder.

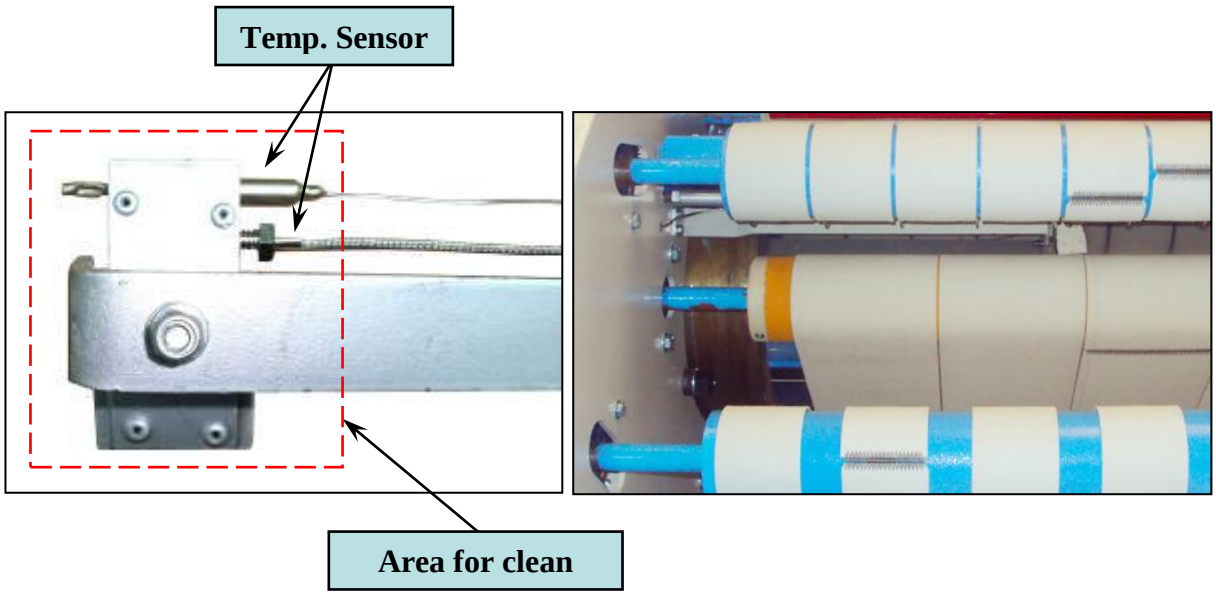


Figure.4-1 Temperature Sensor Installation

C. OPERATION

To Operate Ironer:

1. Be familiar with the controls-see diagram on the previous page.

2. Turn the heat control to the OFF position, and rotate the speed control to the minimum (counter-clockwise) position.

3. Press the green start button for 1-2 seconds.

4. Ensure that the feed belts rotate towards the ironing cylinder.

5. Verify that the finger/hand guard safety panel immediately stops the ironer when pressed. If the ironer does not stop, discontinue use and follow all lock out/tag out procedures and call a qualified service technician.

6. Restart the ironer by pressing the green start button for 1-2 seconds.

IMPORTANT: For steam heated machines, open the steam supply valve VERY SLOWLY to avoid damage to the rotating steam joint.

7. Turn the heat switch to the ON position. After 30 seconds, heating will begin. The temperature indicator on the temperature control should indicate increasing temperature. The set temperature is factory programmed to 130 °C (266°F).

8. The heat indicator lamp will go out once the set temperature is reached.

9. Place linen on the feed table, allowing the feed belts to automatically pull the goods into the ironer.

NOTE: When ironing small goods such as pillow cases, work from left to right along the length of the ironer. This will provide optimum results-running small goods in "lanes" will result in cool spots on the cylinder and poor ironing performance, and could damage the feeding and return belts. See the diagram on the next page.

10. Turn the speed control clockwise to increase the speed, or counter-clockwise to decrease the speed. Slower speeds should be used if the goods are not exiting the ironer fully dry. Adjust the speed according to the weight and residual moisture of the goods. Obviously, thicker, wetter goods will require slower speeds than thinner, dryer goods.

11. Remover the finished goods from the output table, and fold or hang goods to prevent wrinkling.

12. To shut down the ironer at the end of the day, turn the heat switch to the OFF position, and allow the ironer to cool down to 70°C (158°F) before pressing the red stop button to power down the ironer.

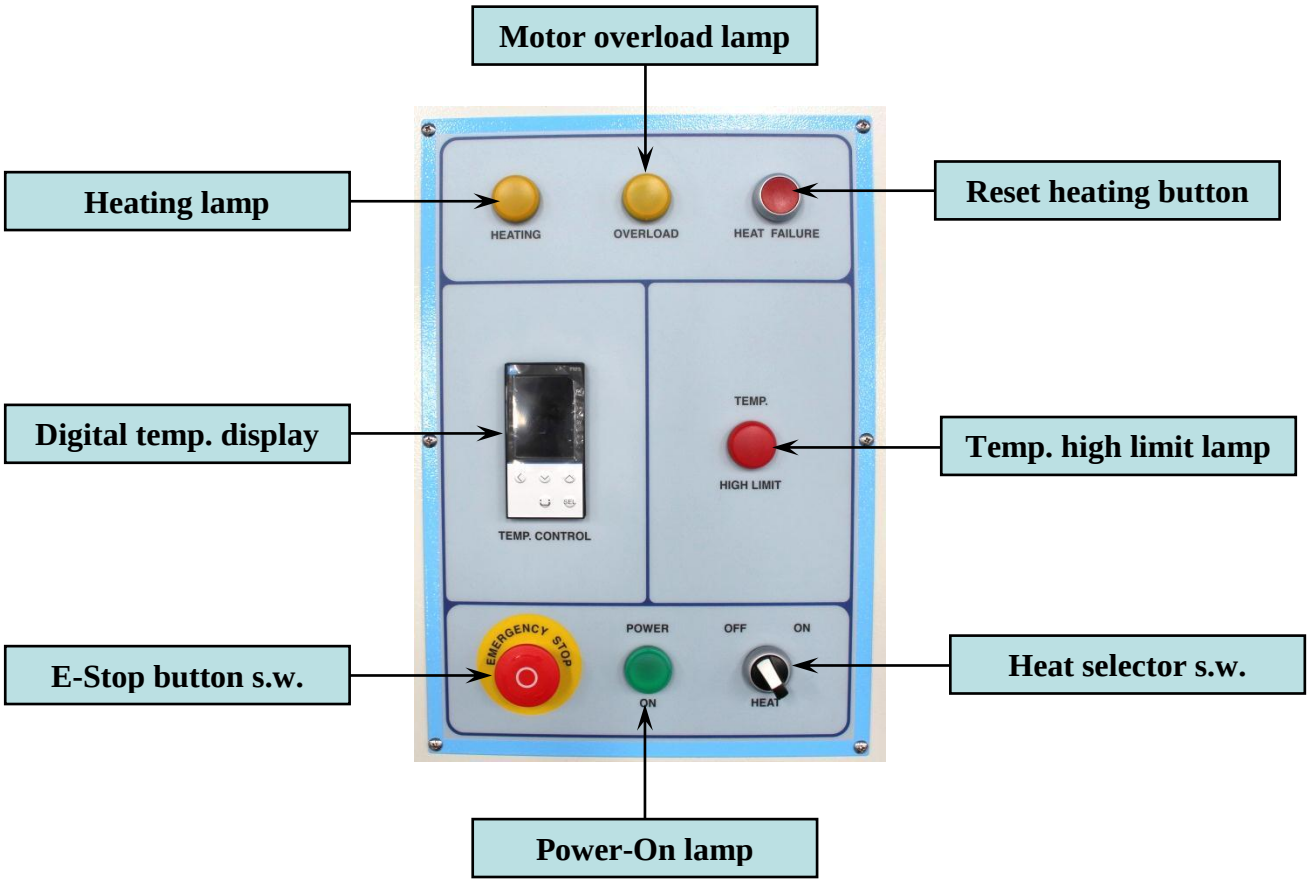


Figure.4-2 Right Control Panel

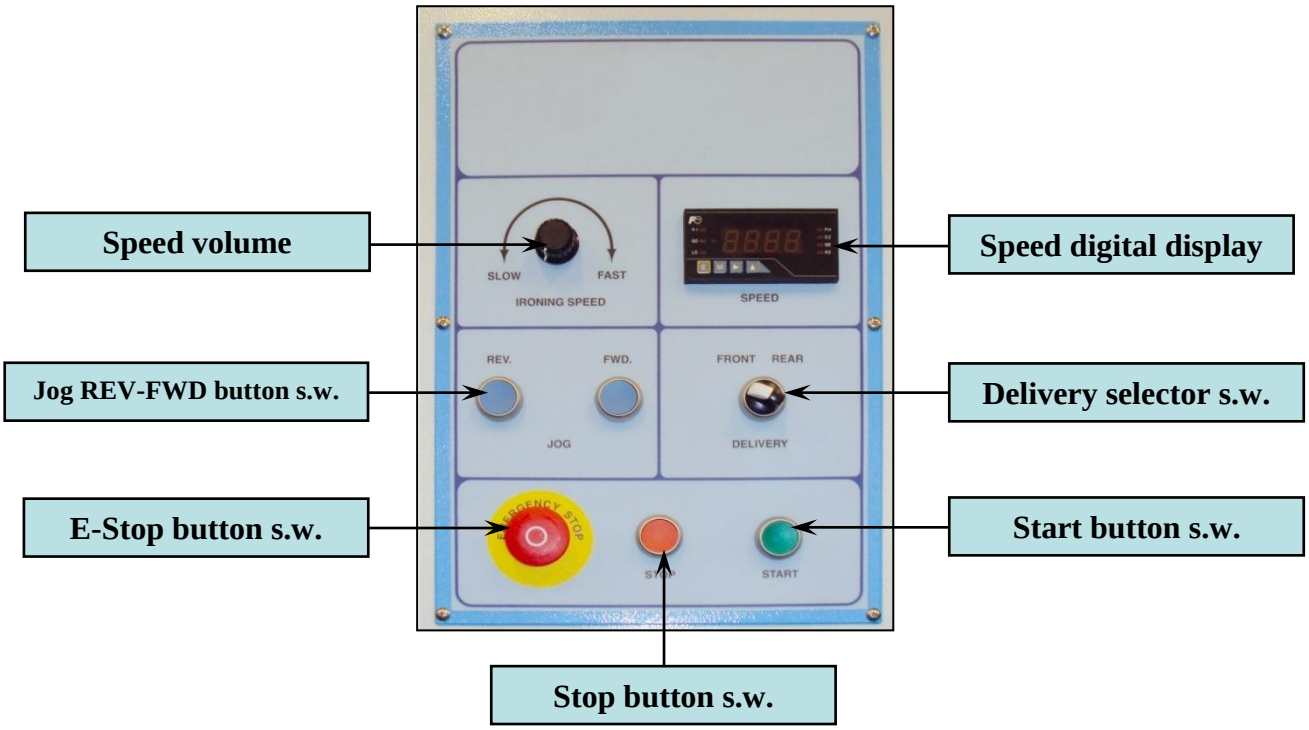
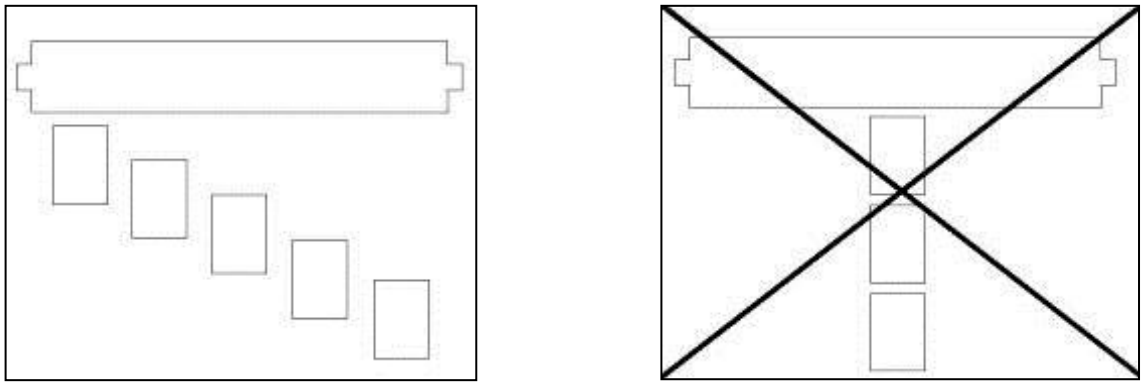


Figure.4-2 Left Control Panel

For Best finish Results:

- The pH of the goods to be ironed must be between 5.5 and 6.5.
- Do not use fabric softener! Fabric softener will be deposited onto the feeding belts and ironing cylinder causing poor performance and maintenance problems.



Proper feeding of small goods.

Improper feeding of small goods.

Figure.4-3 Feeding Suggestion

SECTION 5

MAINTENANCE

A. DAILY MAINTENANCE

Cleaning the Ironer

After each shift, the ironer should be generally cleaned and the waxed as follows:

1. Run cleaning rags through the ironer at low speed.
2. Run waxing rags through the ironer until all the working surfaces of the roller are evenly waxed.
3. In the event that waxing rags are not available, spread some wax chips evenly on one half of a white sheet, fold this sheet and run it through the roller. Repeat this operation until the whole working surfaces of the roller are evenly waxed.

After the waxing procedure, start by ironing dark pieces of linen only.

Cleaning and waxing the roller should only be done at low speed setting. Just waxing the roller is not sufficient.

UNUSUAL NOISE AWARENESS

Operator should be aware of unusual noise, which could indicate failure of parts (Be aware of normal meaning noise of the Machine. If unusual noise is heard, call the maintenance to check)

General Check

1. Check the roller for damages.
2. Disconnect main power switch.
3. Check finger guard, it should move freely without resistance.
4. Check ribbons for damages and proper tension.
5. Check in feed belts for proper tension.
6. Check all safety features for proper operation.
7. Cleaning sensor holder and temp control.
8. Check gas pressure of the gas supply (for gas model).
9. Remove the motor's filter and clean it by blowing. (Only machine with filter)

B. WEEKLY MAINTENANCE

Cleaning the Ironer

At the end of the week, the ironer should be checked and maintained as follows:

1. Clean and wax ironer as described in the daily maintenance.
2. Remove dirt and chemical residues from roller.

NOTE: Using. High pressure hoses and steam cleaners for cleaning purposes may cause damages and will void warranty.

General Check

1. Disconnect main power switch.
2. Check ribbon conveyer.
3. Check in feed belts for proper tension.
4. Apply grease for lubrication of all bearing.
5. Check chain tension, adjust if necessary.
6. Check gas flames concentrated (for gas model).
7. Check for dry bearing.
   - Check for noisy bearing.
   - Check for bearing that may have excessive run out of grease due to over heat or thinning of the grease. If found change to a higher temperature grease specification.

Cleaning the Motors

Clean air intake grids of electric motors to avoid overheating.

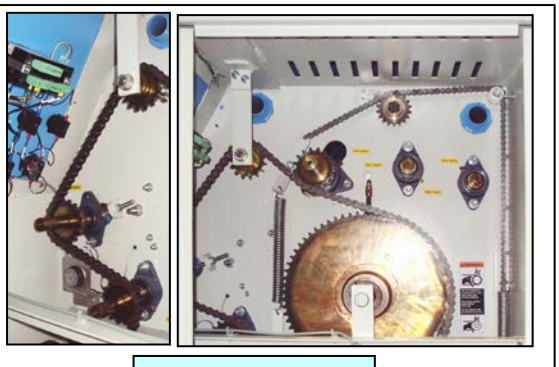
C. MONTHLY MAINTENANCE

Perform maintenance as described in daily and weekly maintenance (sections Daily Maintenance, Weekly Maintenance), thereafter:

GREASING

Bearings, Bushings, Chains

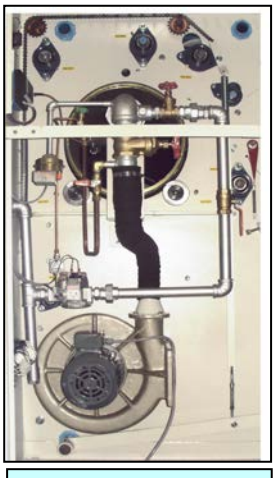
All bearings need regular service and maintenance by grease all bearing.



Drive Side

DARMEX-88 | DARMEX-77

Electrical Type



Gas Type

Steam Type

- Apply grease to bearing of support Ring (Electrical, Gas type machine) DARMEX-88 (Or equivalent compatible grease). See spec next page.

DARMEX-88

- Apply grease to all other Bearing DARMEX-77. See spec next page.

DARMEX-77

Checking the In feed Belts

The in feed belts should not show any slip on the in feed roller. Check for damaged belts and replace immediately.

General Check

1. Applying lubricating oil driving chain.
2. Applying grease, for lubrication of bearings every month (DARMEX-77, DARMEX-88).
3. Check nuts, bolt and screws are tight.
4. Cleaning gas tube (for gas model).
5. Clean the exhaust system, including blower and ductwork.
6. Clean the AC drive cooling fan and heat sink, located on the underside of the drive.
7. Clean the ironing cylinder, removing any residue.
8. Clean the steam trap filter (obviously, steam model).

STEAM TYPE clean steam supply filter

1. Turn off steam supply and allow time for the valve to cool if necessary.
2. Unscrew nut.
3. Remove element and clean.
4. Replace element and nut.

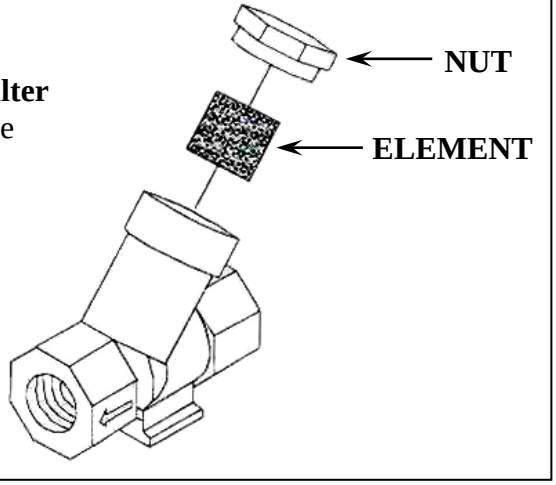


Figure.5-1 Diagram For Typical Trap.

D. AC DRIVE MAINTENANCE

Perform daily and periodic inspection to avoid trouble and keep reliable operation for a long time. Take care of the following during work.

WARNING

The electric charge in the DC bus capacitor may be being charged even after the power is turned off. Therefore, it may take a long time until the DC link circuit voltage reaches a safety potential. Do not open the control circuit terminal block cover within 5 minutes after the power ha been turned off. Then remove the control circuit and main circuit terminal block covers. Check that the DE link circuit voltage between main circuit terminals P(+) and N(-) does not exceed the safety voltage (+25 VDC) with a multimeter and start the maintenance and inspection.

Electric shock may occur.

- Maintenance, inspection, and parts replacement should be mace only by authorized persons.
- Take off the watch, rings and other metallic matter before starting work.
- Use insulates tools.
- Never remodel

Electric shock or injuries could occur.

Daily Inspection

Visually inspect errors in the state of operation from the outside without removing the covers while the inverter operates or while it is turned on.

- Check if the expected performance (satisfying the standard specification) is obtained.
- Check if the surrounding environment satisfies "Operating Environment."
- Check that the LED monitor displays normally.
- Check for abnormal noise, odor, or excessive vibration.
- Check for traces of overheat, discoloration and other defects.

Judgement of service life using maintenance information

Menu#5 "Maintenance information" in Programming mode can be used to display data for the judgement of replacement of "DC bus capacitor," "electrolytic capacitor on the printed circuit board"and"cooling fan" as a guide.

If the replacement data is out of the judgement level for early warning, an early warning signal is output to an external device through terminal (Y1) (function code E20). (When any replacement data is out of the judgement level, terminal (Y1) outputs ON signal.)

Part Replacement Judgement with Menu#5 "Maintenance Information"

Parts to be replaced	Judgement level
DC bus capacitor	85% or lower of the capacitance than that of the factory setting
Electrolytic capacitor on the printed circuit board.	61,000 hours or longer as accumulated run time
Cooling fan (Applicable motor rating: 1.5 to 3.7 kW).	61,000 hours or longer as accumulated run time (Assumed life of cooling fan at ambient inverter temperature of 40ºC).

1. DC bus capacitor

Measure the capacitance of the DC bus capacitor as follows:

The capacitance is displayed in the reduction ratio (%) of the initial value written in the inverter memory before shipment.

Capacitance measurement procedure

1. Remove the RS485 communications card (option) from the inverter if it is mounted. Disconnect the DC bus link circuit to other inverters from terminals P (+) and N (-) of the main circuit if any. A DC reactor (option) and braking resistor (option) may not be disconnected. Keep the ambient temperature at 25 ± 10°C.
2. Turn off the digital inputs (FWD, REV, and X1 to X3) at the control terminals.
   - If an external potentiometer is connected, to terminal (13), remove it.
   - Set the data of function codes E20 and E27 as the transistor output (Y1) or relay output (30A, B, C) does not come on while the inverter power is turned off. E.g. recommended settings are to assign normal logic signal (RUN) and (ALM) to terminals (Y1) and (30A, B, C,) respectively.
3. Turn the inverter power on.
4. Check that the cooling fan rotates and the inverter is on halt.
5. Turn the main power supply off. Start measuring the capacitance of the DC bus capacitor.
6. After the LED monitor is unlit completely, turn the main power supply on again.
7. Select Menu#5 “Maintenance Information” in Programming mode, and check the reduction ratio (%) of the capacitance of the DC bus capacitor.

2. Electrolytic capacitor on the printed circuit board

The inverter keeps an accumulative total of the number of hours that power has been applied to the control circuit and displays it on the LED monitor. Use this to determine when the capacitor should be replaced. The display is in units of 1000 hours.

3. Cooling fan

The inverter accumulates hours for which the cooling fan has run. The display is in units of 1000 hours.

The accumulated time should be used just a guide since the actual service life will be significantly affected by the temperature and operation environment.

SECTION 6

TROUBLE SHOOTING

A. THE MACHINE TROUBLE SHOOTING

Problem	Cause	Remedy
Drive motor failure	Motor is mechanically overloaded or overheated.	Check for free rotation. Check gear box. Check overload relays. Check drives belt tension. Check cooling fan.
Blower motor failure.	Motor is mechanically overloaded or overheated.	Check for free rotation. Check overload relays. Check cooling fan.
Ironer will not start.	Power failure. Main powers switch off. Emergency buttons activated.	Restore power. Reset power switch. Reset emergency switches.
The drive will not start.	Limit switch faulty	Check switch or replace.
Linen wrinkles.	Precession between rollers too small.	Adjust precession. Clean check of chemicals.
Linen runs at an angle.	Dirt or chemicals in the chests. Rollers misaligned.	Clean checks and rewax. Adjust rollers.
Linen humid.	Ironing speed too high. Steam pressure and/or temperature too low. Padding clogged.	Reduce ironing speed. Adjust steam pressure and/or temperature. Replace padding.
Linen smells burned.	Ironing speed too low. Steam pressure and/or temperature too high.	Adjust ironing speed. Adjust steam pressure and/or temperature.
Guide ribbon rips.	Precession too high.	Adjust precession.
Ironer will not run.	Finger guard activated. Limit switch misaligned.	Check cause. Check limit switch.
Ammeter reading too high.	Drive train overloaded. V-belt too tight. Roller pressure too high. Drive motor faulty.	Check drive gear box. Adjust tension. Adjust pressure. Checks drive motor.
Ironer not hot enough, steam pressure and temperature too low.	Steam valve not fully opened. Condensate traps dirty or faulty.	Check steam valve. Check condensate traps replace if required.

: Case to problem please calls back

B. THE AC DRIVE TROUBLE SHOOTING

Before Proceeding with Troubleshooting

WARNING

If any of the protective functions have been activated, first remove the cause. Then, after checking that the all run commands are set to off, reset the alarm. Note that if the alarm is reset while any run commands are set to on, the inverter any supply the power to the motor which may cause the motor to rotate.

Injury may occur.

- Even though the inverter has interrupted power to the motor, if the voltage is applied to the main circuit power input terminals L1/R, L2/S and L2/T (L1/L and L2/N for single-phase voltage input), voltage may be output to inverter output terminals U, V, and W.
- Some electric charge may remain in the DC bus capacitor even after the power is turned off. Therefore, it may take some time until the DC link circuit voltage reaches a safe level. Before touching the circuit, wait for at least five minutes after the power has been turned off and check that the DC voltage between main circuit terminals P (+) and N(-) is less than +25 VDC using a multimeter.

Electric shock may occur.

Follow the procedure below to solve problems.

1. First, check that the inverter is correctly wired, referring “Wiring for Main Circuit Terminals and Grounding Terminals”
2. Check whether an alarm code is displayed on the LED monitor. If no alarm code appears on the LED monitor

If any problems persist after the above recovery procedure, contact the shop where you bought the inverter or your local Fuji branch office.

Identifying a trip / trip source

Some trips only contain a trip string whereas some other trips have a trip string along with a sub-trip number which provides the user with additional information about the trip.

A trip can be generated from a control system or from a power system. The sub-trip number associated with the trips listed in Table is in the form xxyzz and used to identify the source of the trip.

Table Trips associated with xxyzz sub-trip number

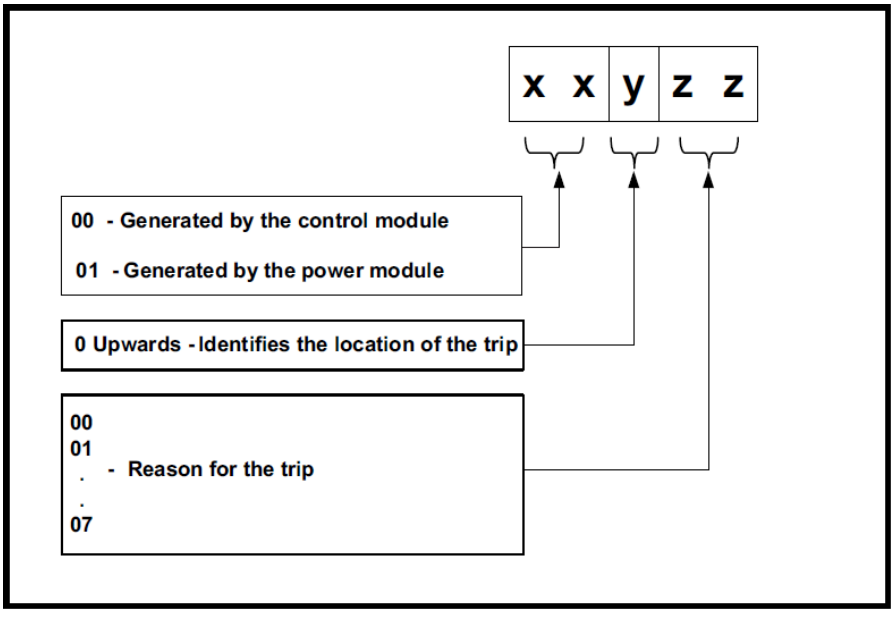
OV	PH.Lo
PSU	OI.Sn
Oht.I	tH.Fb
Oht.P	P.dAt
Oh.dc	

The digits xx are 00 for a trip generated by the control system. For a drive, if the trip is related to the power system then xx will have a value of 01, when displayed the leading zeros are suppressed.

For a control system trip (xx is zero), the y digit where relevant is defined for each trip. If not relevant, the y digit will have a value of zero.

The zz digits give the reason for the trip and are defined in each trip description.

Key to sub-trip number



Trips, Sub-trip numbers

Table Trip indications

Trip	Diagnosis
C.Acc	**NV Media Card Write fail**
185	The C.Acc trip indicates that the drive was unable to access the NV Media Card. If the trip occurs during the data transfer to the card then the file being written may be corrupted. If the trip occurs when the data being transferred to the drive then the data transfer may be incomplete. If a parameter file is transferred to the drive and this trip occurs during the transfer, the parameters are not saved to non-volatile memory, and so the original parameters can be restored by powering the drive down and up again. **Recommended actions:** • Check NV Media Card is installed / located correctly • Replace the NV Media Card
C.by	**NV Media Card cannot be accessed as it is being accessed by an option module**
178	The C.by trip indicates that an attempt has been made to access a file on NV Media Card, but the NV Media Card is already being accessed by an Option Module. No data is transferred. **Recommended actions:** • Wait for the option module to finish accessing the NV Media Card and re-attempt the required function
C.cPr	**NV Media Card file/data is different to the one in the drive**
188	A compare has been carried out between a file on the NV Media Card and the drive, a C.cPr trip is initiated if the parameters on the NV Media Card are different to the drive. **Recommended actions:** • Set Pr00 to 0 and reset the trip • Check to ensure the correct data block on the NV Media Card has been used for the compare
C.d.E	**NV Media Card data location already contains data**
179	The C.d.E trip indicates that an attempt has been made to store data on a NV Media Card in a data block which already contains data. **Recommended actions:** • Erase the data in data location • Write data to an alternative data location
C.dAt	**NV Media Card data not found**
183	The C.dAt trip indicates that an attempt has been made to access a non-existent file on the NV Media Card. No data is transferred. **Recommended actions:** • Ensure data file number is correct

<table>
<tr><th>Trip</th><th>Diagnosis</th></tr>
<tr><td>C.Err</td><td>NV Media Card data structure error</td></tr>
<tr><td>182</td><td>The C.Err trip indicates that an attempt has been made to access the NV Media Card but an error has been detected in the data structure on the card. Resetting the trip will cause the drive to erase and create the correct folder structure. On an SD card, whilst this trip is present, missing directories will be created and if the header file is missing it will be created. The cause of the trip can be identified by the sub-trip.
<table>
<tr><th>Sub-trip</th><th>Reason</th></tr>
<tr><td>1</td><td>The required folder and file structure is not present</td></tr>
<tr><td>2</td><td>The 000.DAT file is corrupted</td></tr>
<tr><td>3</td><td>Two or more files in the <MCDF\> folder have the same file identification number</td></tr>
</table>
Recommended actions:
• Erase all the data block and re-attempt the process
• Ensure the card is located correctly
• Replace the NV Media Card</td></tr>
<tr><td>C.Ful</td><td>NV Media Card full</td></tr>
<tr><td>184</td><td>The C.Ful trip indicates that an attempt has been made to create a data block on a NV Media Card, but there is not enough space left on the card. No data is transferred.
Recommended actions:
• Delete a data block or the entire NV Media Card to create space
• Use a different NV Media Card</td></tr>
<tr><td>C.OPt</td><td>NV Media Card trip; option module installed is different between source drive and destination drive</td></tr>
<tr><td>180</td><td>The C.OPt trip indicates that parameter data is being transferred from the NV Media Card to the drive, but the option module category is different between the source and destination drives. This trip does not stop the data transfer, but is a warning that the data for the option module that is different will be set to the default values and not the values from the card. This trip also applies if a compare is performed between the data block on the card and the drive, and the option module fitted is different between the source and target.
Recommended actions:
• Ensure the correct option module is installed.
• Press the red reset button to acknowledge that the parameters for the option module installed will be at their default values
• This trip can be suppressed by setting Pr 00 to 9666 and resetting the drive.</td></tr>
</table>

<table>
<tr><th>Trip</th><th>Diagnosis</th></tr>
<tr><td>C.Pr</td><td>NV Media Card data blocks are not compatible with the drive derivative</td></tr>
<tr><td>175</td><td>The C.Pr trip is initiated either at power-up or when the card is accessed, If Drive Derivative (11.028) or Product Type (11.063) are different between the source and target drives. This trip can be reset and data can be transferred in either direction between the drive and the card.
<table>
<tr><th>Sub-trip</th><th>Reason</th></tr>
<tr><td>1</td><td>If Drive Derivative (11.028) is different between the source and target drives. This trip is initiated either at power-up or when the SD card is accessed. This trip can be reset and data can be transferred in either direction between the drive and the card.</td></tr>
<tr><td>2</td><td>If Product Type (11.063) is different between the source and target drives or the file is corrupted or incompatible. This trip is initiated either at power-up or when the SD card is accessed. This trip can be reset but no data are transferred in either direction between the drive and the card.</td></tr>
</table>
Recommended actions:
• Use a different NV Media Card
• This trip can be suppressed by setting Pr 00 to 9666 and resetting the drive
• Choose a file compatible between the source and target drives, if sub-trip 2.</td></tr>
<tr><td>C.rdo</td><td>NV Media Card has the Read Only bit set</td></tr>
<tr><td>181</td><td>The C.rdo trip indicates that an attempt has been made to modify data on a read-only NV Media Card or to modify a read-only data block. A NV Media Card is read-only if the read-only flag has been set.
Recommended actions:
• Clear the read only flag by setting Pr 00 to 9777 and reset the drive. This will clear the read-only flag for all data blocks in the NV Media Card</td></tr>
<tr><td>C.rtg</td><td>NV Media Card Trip; The voltage and / or current rating of the source and destination drives are different</td></tr>
<tr><td>186</td><td>The C.rtg trip indicates that parameter data is being transferred from the NV Media Card to the drive, but the current and / or voltage ratings are different between source and destination drives. This trip also applies if a compare (using Pr mm.000 set to 8yyy) is performed between the data block on a NV Media Card and the drive. The C.rtg trip does not stop the data transfer but is a warning that rating specific parameters with the RA attribute may not be transferred to the destination drive.
Recommended actions:
• Reset the drive to clear the trip
• Ensure that the drive rating dependent parameters have transferred correctly
• This trip can be suppressed by setting Pr 00 to 9666 and resetting the drive.</td></tr>
</table>

Trip	Diagnosis
C.SL	**NV Media Card trip; Option module file transfer has failed**
174	The C.SL trip is initiated, if the transfer of an option module file to or from a module failed because the option module does not respond correctly. If this happens this trip is produced with the sub-trip number indicating the option module slot number.
C.tyP	**NV Media Card parameter set not compatible with current drive mode**
187	The C.tyP trip is produced during a compare if the drive mode in the data block on the NV Media Card is different from the current drive mode. This trip is also produced if an attempt is made to transfer parameters from a NV Media Card to the drive if the operating mode in the data block is outside the allowed range of operating modes, for the target drive. **Recommended actions:** • Ensure the destination drive supports the drive operating mode in the parameter file. • Clear the value in Pr 00 and reset the drive • Ensure destination drive operating mode is the same as the source parameter file
cL.A1	**Analog input 1 current loss**
28	The cL.A1 trip indicates that a current loss was detected in current mode on Analog input 1 (Terminal 2). In 4-20 mA and 20-4 mA modes loss of input is detected if the current falls below 3 mA. **Recommended actions:** • Check control wiring is correct • Check control wiring is undamaged • Check the Analog Input 1 Mode (07.007) • Current signal is present and greater than 3 mA
CL.bt	**Trip initiated from the Control Word (06.042)**
35	The CL.bt trip is initiated by setting bit 12 on the control word in Pr 06.042 when the control word is enabled (Pr 06.043 = On). **Recommended actions:** • Check the value of Pr 06.042. • Disable the control word in Control Word Enable (Pr 06.043) Bit 12 of the control word set to a one causes the drive to trip on Control Word When the control word is enabled, the trip can only be cleared by setting bit 12 to zero
Cur.c	**Current calibration range**
231	Current calibration range error. **Recommended actions:** • Hardware fault - Contact the supplier of the drive.

<table>
<tr><th>Trip</th><th>Diagnosis</th></tr>
<tr><td>Cur.O</td><td>Current feedback offset error</td></tr>
<tr><td>225</td><td>The Cur.O trip indicates that the current offset is too large to be trimmed.
Recommended actions:
• Ensure that there is no possibility of current flowing in the output phases of the drive when the drive is not enabled
• Hardware fault – Contact the supplier of the drive</td></tr>
<tr><td>d.Ch</td><td>Drive parameters are being changed</td></tr>
<tr><td>97</td><td>A user action or a file system write is active that is changing the drive parameters and the drive has been commanded to enable, i.e. Drive Active (10.002) = 1.
The user actions that change drive parameters are loading defaults, changing drive mode, or transferring data from an NV memory card to the drive. The file system actions that will cause this trip to be initiated if the drive is enabled during the transfer is writing a parameter or macro file to the drive. It should be noted that none of these actions can be started if the drive is active, and so the trip only occurs if the action is started and then the drive is enabled.
Recommended actions:
• Ensure the drive is not enabled when one of the following is being carried out:
Loading defaults
Changing drive mode
Transferring data from NV media card</td></tr>
<tr><td>dcct</td><td>dcct reference out of range for size 5 upwards only</td></tr>
<tr><td>110</td><td>The sub-trip number indicates the DCCT that has caused the trip.
Recommended actions:
• Hardware fault - Contact the supplier of the drive</td></tr>
<tr><td>dEr.E</td><td>Derivative file error</td></tr>
<tr><td>246</td><td>Derivative file error with sub-trips:
<table>
<tr><th>Sub-trip</th><th>Reason</th><th>Comments</th></tr>
<tr><td>1</td><td>The derivative file is missing or is invalid</td><td>Occurs when the drive powers-up. Load valid derivative file matching the control board hardware.</td></tr>
<tr><td>2</td><td>The derivative file does not match the control board hardware</td><td>Occurs when the drive powers-up. Load valid derivative file matching the control board hardware.</td></tr>
<tr><td>3</td><td>The derivative file has been changed for a file with a different derivative number.</td><td>Occurs when the drive powers-up or the file is programmed. The file tasks will not run.</td></tr>
</table>
Recommended actions:
• Contact the supplier of the drive</td></tr>
</table>

<table>
<tr><th>Trip</th><th>Diagnosis</th></tr>
<tr><td>dEr.I</td><td>Derivative product image error</td></tr>
<tr><td>248</td><td>The dEr.I trip indicates that an error has been detected in the derivative product image. The reason for the trip can be identified by the sub-trip number.
<table>
<tr><th>Sub-trip</th><th>Reason</th><th>Comments</th></tr>
<tr><td>1</td><td>Divide by zero</td><td></td></tr>
<tr><td>2</td><td>Undefined trip</td><td></td></tr>
<tr><td>3</td><td>Attempted fast parameter access set-up with non-existent parameter</td><td></td></tr>
<tr><td>4</td><td>Attempted access to non-existent parameter</td><td></td></tr>
<tr><td>5</td><td>Attempted write to read-only parameter</td><td></td></tr>
<tr><td>6</td><td>Attempted an over-range write</td><td></td></tr>
<tr><td>7</td><td>Attempted read from write-only parameter</td><td></td></tr>
<tr><td>30</td><td>The image has failed because either its CRC is incorrect, or there are less than 6 bytes in the image or the image header version is less than 5</td><td>Occurs when the drive powers-up or the image is programmed. The image tasks will not run</td></tr>
<tr><td>31</td><td>The image requires more RAM for heap and stack than can be provided by the drive.</td><td>As 30</td></tr>
<tr><td>32</td><td>The image requires an OS function call that is higher than the maximum allowed.</td><td>As 30</td></tr>
<tr><td>33</td><td>The ID code within the image is not valid</td><td>As 30</td></tr>
<tr><td>34</td><td>The derivative image has been changed for an image with a different derivative number</td><td>As 30</td></tr>
<tr><td>40</td><td>The timed task has not completed in time and has been suspended</td><td>Reduce code in timed task or power down repeat rate.</td></tr>
<tr><td>41</td><td>Undefined function called, i.e. a function in the host system vector table that has not been assigned</td><td>As 40</td></tr>
<tr><td>51</td><td>Core menu customization table CRC check failed</td><td>As 30</td></tr>
<tr><td>52</td><td>Customizable menu table CRC check failed</td><td>As 30</td></tr>
<tr><td>53</td><td>Customizable menu table changed</td><td>Occurs when the drive powers-up or the image is programmed and the table has changed. Defaults are loaded for the derivative menu and the trip will keep</td></tr>
</table></td></tr>
</table>

<table>
<tr><td></td><td>
<table>
<tr><td></td><td></td><td>occurring until drive parameters are saved.</td></tr>
<tr><td>61</td><td>The option module installed in slot 1 is not allowed with the derivative image</td><td>As 30</td></tr>
<tr><td>80</td><td>Image is not compatible with the control board</td><td>Initiated from within the image code</td></tr>
<tr><td>81</td><td>Image is not compatible with the control board serial number</td><td>As 80</td></tr>
</table>
Recommended actions:
• Contact the supplier of the drive
</td></tr>
<tr><td>dESt</td><td>Two or more parameters are writing to the same destination parameter</td></tr>
<tr><td>199</td><td>The dESt trip indicates that destination parameters of two or more functions (Menus 7, 8, 9, 12 or 14) within the drive are writing to the same parameter.
Recommended actions:
• Set Pr00 to ‘dest’ or 12001 and check all visible parameters in all menus for parameter write conflicts</td></tr>
<tr><td>dr.CF</td><td>Drive configuration</td></tr>
<tr><td>232</td><td>The hardware ID does not match the user software ID.
<table>
<tr><th>Sub-trip</th><th>Reason</th></tr>
<tr><td>1</td><td>The hardware ID does not match the user software ID (size 5 upwards only).</td></tr>
<tr><td>2</td><td>Invalid hardware ID.</td></tr>
<tr><td>3</td><td>The hardware ID does not match the user software ID (Size 1-4)</td></tr>
</table>
Recommended actions:
• Hardware fault - Contact the supplier of the drive</td></tr>
</table>

<table>
<tr><th>Trip</th><th>Diagnosis</th></tr>
<tr><td>EEF</td><td>Default parameters have been loaded</td></tr>
<tr><td>31</td><td>
The EEF trip indicates that default parameters have been loaded. The exact cause/reason of the trip can be identified from the sub-trip number.
<table>
<tr><th>Sub-trip</th><th>Reason</th></tr>
<tr><td>1</td><td>The most significant digit of the internal parameter database version number has changed</td></tr>
<tr><td>2</td><td>The CRC's applied to the parameter data stored in internal non-volatile memory indicate that a valid set of parameters cannot be loaded</td></tr>
<tr><td>3</td><td>The drive mode restored from internal non-volatile memory is outside the allowed range for the product or the derivative image does not allow the previous drive mode</td></tr>
<tr><td>4</td><td>The drive derivative image has changed</td></tr>
<tr><td>5</td><td>The power stage hardware has changed</td></tr>
<tr><td>6</td><td>Reserved</td></tr>
<tr><td>7</td><td>Reserved</td></tr>
<tr><td>8</td><td>The control board hardware has changed</td></tr>
<tr><td>9</td><td>The checksum on the non-parameter area of the EEPROM has failed</td></tr>
</table>
The drive holds two banks of user save parameters and two banks of power down save parameters in non-volatile memory. If the last bank of either set of parameters that was saved is corrupted a U.S or Pd.S trip is produced. If one of these trips occurs the parameters values that were last saved successfully are used. It can take some time to save parameters when requested by the user and if the power is removed from the drive during this process it is possible to corrupt the data in the non-volatile memory.

If both banks of user save parameters or both banks of power down save parameters are corrupted or one of the other conditions given in the table above occurs EEF.xxx trip is produced. If this trip occurs it is not possible to use the data that has been saved previously, and so the drive will be loaded with default parameters. The trip can only be reset if Parameter 00 (mm.000) is set to 10, 11, 1233 or 1244 or if Load Defaults (11.043) is set to a non-zero value.

Recommended actions:
• Default the drive and perform a reset
• Allow sufficient time to perform a save before the supply to the drive is removed
• If the trip persists - return drive to supplier
</td></tr>
</table>

<table>
<tr><th>Trip</th><th>Diagnosis</th></tr>
<tr><td>Et</td><td>An External trip is initiated</td></tr>
<tr><td>6</td><td>An Et trip has occurred. The cause of the trip can be identified from the sub trip number displayed after the trip string. See table below. An external trip can also be initiated by writing a value of 6 in Pr 10.038.
<table><tr><th>Sub-trip</th><th>Reason</th></tr><tr><td>3</td><td>External Trip (10.032) = 1</td></tr></table>Recommended actions:
• Check the value of Pr 10.032.
• Select ‘dest’ (or enter 12001) in Pr 00 and check for a parameter controlling Pr 10.032.
• Ensure Pr 10.032 or Pr 10.038 (= 6) is not being controlled by serial comms</td></tr>
<tr><td>FAn.F</td><td>Fan fail</td></tr>
<tr><td>173</td><td>This trip cannot be reset until 10 s after the trip was initiated.
Recommended actions:
• Check that the fan is installed and connected correctly.
• Check that the fan is not obstructed.
• Contact the supplier of the drive to replace the fan.</td></tr>
<tr><td>Fi.Ch</td><td>File changed</td></tr>
<tr><td>247</td><td>Recommended actions:
• Power cycle the drive.</td></tr>
<tr><td>FI.In</td><td>Firmware incompatibility</td></tr>
<tr><td>237</td><td>The FI.In trip indicates that the user firmware is incompatible with the power firmware.
Recommended actions:
Re-program the drive with the latest version of the drive firmware for the Commander C200/C300, using Connect.</td></tr>
<tr><td>HF01</td><td>Data processing error: CPU hardware fault</td></tr>
<tr><td></td><td>The HF01 trip indicates that a CPU address error has occurred. This trip indicates that the control PCB on the drive has failed.
Recommended actions:
• Hardware fault - Contact the supplier of the drive</td></tr>
<tr><td>HF02</td><td>Data processing error: CPU memory management fault</td></tr>
<tr><td></td><td>The HF02 trip indicates that a DMAC address error has occurred. This trip indicates that the control PCB on the drive has failed.
Recommended actions:
• Hardware fault - Contact the supplier of the drive</td></tr>
</table>

Trip	Diagnosis
HF03	**Data processing error: CPU has detected a bus fault**
	The HF03 trip indicates that a bus fault has occurred. This trip indicates that the control PCB on the drive has failed. **Recommended actions:** • Hardware fault - Contact the supplier of the drive
HF04	**Data processing error: CPU has detected a usage fault**
	The HF04 trip indicates that a usage fault has occurred. This trip indicates that the control PCB on the drive has failed. **Recommended actions:** • Hardware fault - Contact the supplier of the drive
HF05	**Reserved**
HF06	**Reserved**
HF07	**Data processing error: Watchdog failure**
	The HF07 trip indicates that a watchdog failure has occurred. This trip indicates that the control PCB on the drive has failed. **Recommended actions:** • Hardware fault - Contact the supplier of the drive
HF08	**Data processing error: CPU Interrupt crash**
	The HF08 trip indicates that a CPU interrupt crash has occurred. This trip indicates that the control PCB on the drive has failed. The crash level is indicated by the sub-trip number. **Recommended actions:** • Hardware fault - Contact the supplier of the drive
HF09	**Data processing error: Free store overflow**
	The HF09 trip indicates that a free store overflow has occurred. This trip indicates that the control PCB on the drive has failed. **Recommended actions:** • Hardware fault - Contact the supplier of the drive
HF10	**Reserved**

<table>
<tr><th>Trip</th><th>Diagnosis</th></tr>
<tr><td>HF11</td><td>Data processing error: Non-volatile memory comms error</td></tr>
<tr><td></td><td>The HF11 trip indicates that a non-volatile memory comms error has occurred. This trip indicates that the control PCB on the drive has failed. The crash level is indicated by the sub-trip number.
<table>
<tr><th>Sub-trip</th><th>Reason</th><th>Recommended action</th></tr>
<tr><td>1</td><td>Non-volatile memory comms error.</td><td>Hardware fault-contact the supplier of the drive.</td></tr>
<tr><td>2</td><td>EEPROM size is incompatible with the user firmware.</td><td>Re-program drive with compatible user firmware.</td></tr>
</table></td></tr>
<tr><td>HF12</td><td>Data processing error: Main program stack overflow</td></tr>
<tr><td></td><td>The HF12 trip indicates that the main program stack over flow has occurred. The stack can be identified by the sub-trip number. This trip indicates that the control PCB on the drive has failed.
<table>
<tr><th>Sub-trip</th><th>Reason</th></tr>
<tr><td>1</td><td>Derivative background stack overflow</td></tr>
<tr><td>2</td><td>Derivative timed stack overflow</td></tr>
<tr><td>3</td><td>Main system interrupt stack overflow</td></tr>
<tr><td>4</td><td>Main system background stack overflow</td></tr>
</table>
Recommended actions:
• Hardware fault – Contact the supplier of the drive</td></tr>
<tr><td>HF13</td><td>Reserved</td></tr>
<tr><td></td><td></td></tr>
<tr><td>HF14</td><td>Reserved</td></tr>
<tr><td></td><td></td></tr>
<tr><td>HF15</td><td>Reserved</td></tr>
<tr><td></td><td></td></tr>
<tr><td>HF16</td><td>Data processing error: RTOS error</td></tr>
<tr><td></td><td>The HF16 trip indicates that a RTOS error has occurred. This trip indicates that the control PCB on the drive has failed.
Recommended actions:
• Hardware fault - Contact the supplier of the drive</td></tr>
<tr><td>HF17</td><td>Reserved</td></tr>
<tr><td></td><td></td></tr>
</table>

<table>
<tr><th>Trip</th><th>Diagnosis</th></tr>
<tr><td>HF18</td><td>Data processing error: Internal flash memory has failed</td></tr>
<tr><td></td><td>The HF18 trip indicates that the internal flash memory has failed when writing option module parameter data. The reason for the trip can be identified by the sub-trip number.
<table>
<tr><th>Sub-trip</th><th>Reason</th></tr>
<tr><td>1</td><td>Programming error while writing menu in flash</td></tr>
<tr><td>2</td><td>Erase flash block containing setup menus failed</td></tr>
<tr><td>3</td><td>Erase flash block containing application menus failed</td></tr>
</table>
Recommended actions:
Hardware fault - contact the supplier of the drive.</td></tr>
<tr><td>HF19</td><td>Data processing error: CRC check on the firmware has failed</td></tr>
<tr><td></td><td>The HF19 trip indicates that the CRC check on the drive firmware has failed. The drive is now in its bootloader mode and is waiting for a new image to be downloaded using Connect. Once a new image is downloaded, the drive can run normally.
Recommended actions:
• Re-program the drive with latest control and power firmware using Connect.
• Hardware fault - Contact the supplier of the drive</td></tr>
<tr><td>HF23</td><td>Hardware fault</td></tr>
<tr><td></td><td>Recommended actions:
• If this trip occurs, contact the supplier of the drive.</td></tr>
<tr><td>It.Ac</td><td>Output current overload timed out (I^2t)</td></tr>
<tr><td>20</td><td>The It.Ac trip indicates a motor thermal overload based on the Motor Rated Current (Pr 05.007) and Motor Thermal Time Constant (Pr 04.015). Pr 04.019 displays the motor temperature as a percentage of the maximum value. The drive will trip on It.AC when Pr 04.019 gets to 100 %.
Recommended actions:
• Ensure the load is not jammed / sticking
• Check the load on the motor has not changed
• Tune the motor rated speed parameter (Pr 05.008) (RFC-A mode only)
• Ensure the motor rated current is not zero</td></tr>
</table>

<table>
<tr><th>Trip</th><th>Diagnosis</th></tr>
<tr><td>It.br</td><td>Braking resistor overload timed out (I^2t)</td></tr>
<tr><td>19</td><td>The It.br trip indicates that braking resistor overload has timed out. The value in Braking Resistor Thermal Accumulator (10.039) is calculated using Braking Resistor Rated Power (10.030), Braking Resistor Thermal Time Constant (10.031) and Braking Resistor Resistance (10.061). The It.br trip is initiated when the Braking Resistor Thermal Accumulator (10.039) reaches 100 %.
Recommended actions:
• Ensure the values entered in Pr 10.030, Pr 10.031 and Pr 10.061 are correct.
• Check resistor value and power rating.
• If an external thermal protection device is being used and the braking resistor software overload protection is not required, set Pr 10.030, Pr 10.031 or Pr 10.061 to 0 to disable the trip.</td></tr>
<tr><td>LF.Er</td><td>Communication has been lost / errors detected between power, control and rectifier modules</td></tr>
<tr><td>90</td><td>This trip is initiated if there is no communications between power, control or the rectifier module or if excessive communication errors have been detected. The reason for the trip can be identified by the sub-trip number.
<table>
<tr><th>Source</th><th>xx</th><th>y</th><th>zz</th></tr>
<tr><td>Control system</td><td>00</td><td>0</td><td>01: No communications between the control system and the power system.</td></tr>
<tr><td>Control system</td><td>00</td><td>0</td><td>02: Excessive communication errors between the control system and power system.</td></tr>
<tr><td>Power system</td><td>01</td><td>1</td><td>00: Excessive communications errors detected by the rectifier module.</td></tr>
</table>
Recommended actions:
• Hardware fault - contact the supplier of the drive.</td></tr>
<tr><td>no.PS</td><td>No power board</td></tr>
<tr><td>236</td><td>No communication between the power and control boards.
Recommended actions:
• Hardware fault - contact the supplier of the drive.</td></tr>
<tr><td>O.Ld1</td><td>Digital output overload</td></tr>
<tr><td>26</td><td>This trip indicates that the total current drawn from the AI Adaptor 24 V or from the digital output has exceeded the limit.
<table>
<tr><th>Sub-trip</th><th>Reason</th></tr>
<tr><td>1</td><td>Digital output or 24 V supply load on control terminal is too high.</td></tr>
<tr><td>2</td><td>AI Adaptor 24 V load is too high</td></tr>
</table>
Recommended actions:
• Check total loads on digital outputs and 24 V
• Check control wiring is correct
• Check output wiring is undamaged</td></tr>
</table>

<table>
<tr><th>Trip</th><th>Diagnosis</th></tr>
<tr><td>O.SPd</td><td>Motor frequency has exceeded the over frequency threshold</td></tr>
<tr><td>7</td><td>In open-loop mode, if the Post-ramp Reference (02.001) exceeds the threshold set in the Over Frequency Threshold (03.008) in either direction, an O.SPd trip is produced. In RFC-A mode, if the Estimated Frequency (03.002) exceeds the Over Frequency Threshold in Pr 03.008 in either direction an O.SPd trip is produced. If Pr 03.008 is set to 0.00 the threshold is then equal to 1.2 x the value set in Pr 01.006.
Recommended actions:
• Reduce the Frequency Controller Proportional Gain (03.010) to reduce the frequency overshoot (RFC-A mode only)
• Check that a mechanical load is not driving motor
• Reduce Current Controller Ki Gain (04.014).</td></tr>
<tr><td>Oht.C</td><td>Control stage over temperature</td></tr>
<tr><td>219</td><td>This trip indicates that a control stage over-temperature has been detected if Cooling Fan control (06.045) = 0.
This trip causes the option module to go to standby and Potential Drive Damage Conditions (10.106) bit 1 to be set.
Recommended actions:
• Increase ventilation by setting Cooling Fan control (06.045) > 0.</td></tr>
<tr><td>Oh.dc</td><td>DC bus over temperature</td></tr>
<tr><td>27</td><td>The Oh.dc trip indicates a DC bus component over temperature based on a software thermal model. The drive includes a thermal protection system to protect the DC bus components within the drive. This includes the effects of the output current and DC bus ripple. The estimated temperature is displayed as a percentage of the trip level in Pr 07.035. If this parameter reaches 100 % then an Oh.dc trip is initiated. The drive will attempt to stop the motor before tripping. If the motor does not stop in 10 seconds the drive trips immediately.
<table>
<tr><th>Source</th><th>xx</th><th>y</th><th>zz</th><th>Description</th></tr>
<tr><td>Control system</td><td>00</td><td>2</td><td>00</td><td>DC bus thermal model gives trip with sub-trip 0</td></tr>
</table>
Recommended actions:
• Check the AC supply voltage balance and levels
• Check DC bus ripple level
• Reduce duty cycle
• Reduce motor load
• Check the output current stability. If unstable;
Check the motor map settings with motor nameplate (Pr 05.006, Pr 05.007, Pr 05.008, Pr 05.009, Pr 05.010, Pr 05.011) - (All Modes)
Disable slip compensation (Pr 05.027 = 0) - (Open loop)
Disable dynamic V to F operation (Pr 05.013 = 0) - (Open loop)
Select fixed boost (Pr 05.014 = Fixed) - (Open loop)
Select high stability space vector modulation (Pr 05.019 = 1) - (Open loop)
Disconnect the load and complete a rotating auto-tune (Pr 05.012)</td></tr>
</table>

<table>
<tr><td></td><td>Reduce frequency loop gains (Pr 03.010, Pr 03.011, Pr 03.012) - (RFC-A)</td></tr>
<tr><td>Trip</td><td>Diagnosis</td></tr>
<tr><td>Oht.I</td><td>Inverter over temperature based on thermal model</td></tr>
<tr><td>21</td><td>This trip indicates that an IGBT junction over-temperature has been detected based on a software thermal model. The Oht.I trip is initiated when the temperature based on the thermal model reaches 145 °C. The trip reset temperature is 139 °C.
<table>
<tr><th>Source</th><th>xx</th><th>y</th><th>zz</th><th>Description</th></tr>
<tr><td>Control system</td><td>00</td><td>1</td><td>00</td><td>nverter thermal model gives {Oht.I} trip with sub-trip 100</td></tr>
</table>
Recommended actions:
• Reduce the selected drive switching frequency
• Ensure Auto-switching Frequency Change Disable (05.035) is set to Off
• Reduce duty cycle
• Increase acceleration / deceleration rates
• Reduce motor load
• Check DC bus ripple
• Ensure all three input phases are present and balanced</td></tr>
</table>

<table>
<tr><th>Trip</th><th>Diagnosis</th></tr>
<tr><td>Oht.P</td><td>Power stage over temperature</td></tr>
<tr><td>22</td><td>
This trip indicates that a power stage over-temperature has been detected. From the sub-trip ‘xxyzz’, the Thermistor location is identified by ‘zz’.
<table>
<tr><th>Source</th><th>xx</th><th>y</th><th>zz</th><th>Description</th></tr>
<tr><td>Power system</td><td>01</td><td>0</td><td>zz</td><td>Thermistor location in the drive defined by zz</td></tr>
</table>
<table>
<tr><th>Drive size</th><th>Trip temperature (°C)</th><th>Trip reset temperature (°C)</th></tr>
<tr><td>1 to 4</td><td>95</td><td>90</td></tr>
<tr><td>5</td><td>115</td><td>110</td></tr>
<tr><td>06200XXX</td><td>115</td><td>110</td></tr>
<tr><td>06400XXX</td><td>125</td><td>120</td></tr>
<tr><td>06500XXX</td><td>120</td><td>115</td></tr>
</table>
Recommended actions:

Check enclosure / drive fans are still functioning correctly
Force the heatsink fans to run at maximum speed
Check enclosure ventilation paths
Check enclosure door filters
Increase ventilation
Reduce the drive switching frequency
Reduce duty cycle
Increase acceleration / deceleration rates
Use S-ramp (Pr02.006)
Reduce motor load
Check the derating tables and confirm the drive is correctly sized for the application.
Use a drive with larger current / power rating

</td></tr>
<tr><td>OI.A1</td><td>Analog input 1 over-current</td></tr>
<tr><td>189</td><td>Current input on analog input 1 exceeds 24 mA.</td></tr>
<tr><td>OI.AC</td><td>Instantaneous output over current detected</td></tr>
<tr><td>3</td><td>
The instantaneous drive output current has exceeded VM_DRIVE_CURRENT_MAX. This trip cannot be reset until 10 s after the trip was initiated.
Recommended actions/checks:

Increase acceleration/deceleration rate
If seen during auto-tune reduce the voltage boost
Check for short circuit on the output cabling
Check integrity of the motor insulation using an insulation tester
Is the motor cable length within limits for the frame size?
Reduce the values in the frequency loop gain parameters - (Pr 03.010, 03.011, 03.012) or (Pr 03.013, 03.014, 03.015)
Reduce the values in the current loop gain parameters

</td></tr>
</table>

<table>
<tr><th>Trip</th><th>Diagnosis</th></tr>
<tr><td>OI.br</td><td>Braking IGBT over current detected: short circuit protection for the braking IGBT activated</td></tr>
<tr><td>4</td><td>The OI.br trip indicates that over current has been detected in braking IGBT or braking IGBT protection has been activated. This trip cannot be reset until 10 s after the trip was initiated.
Recommended actions:
• Check brake resistor wiring
• Check braking resistor value is greater than or equal to the minimum resistance value
• Check braking resistor insulation</td></tr>
<tr><td>OI.SC</td><td>Output phase short-circuit</td></tr>
<tr><td>228</td><td>Over-current detected on drive output when enabled. Possible motor earth fault.
Recommended actions:
• Check for short circuit on the output cabling
• Check integrity of the motor insulation using an insulation tester
• Is the motor cable length within limits for the frame size?</td></tr>
<tr><td>OI.Sn</td><td>Snubber over-current detected</td></tr>
<tr><td>92</td><td>This trip indicates that an over-current condition has been detected in the rectifier snubbing circuit, The exact cause of the trip can be identified by the sub-trip number.
<table>
<tr><th>Source</th><th>xx</th><th>y</th><th>zz</th></tr>
<tr><td>Power system</td><td>01</td><td>1</td><td>00: Rectifier snubber over-current trip detected</td></tr>
</table>
Recommended actions:
• Ensure the internal EMC filter is installed.
• Ensure the motor cable length does not exceed the maximum for selected switching frequency.
• Check for supply voltage imbalance.
• Check for supply disturbance such as notching from a DC drive.
• Check the motor and motor cable insulation with an insulation tester.
• Fit an output line reactor or sinusoidal filter.</td></tr>
</table>

<table>
<tr><th>Trip</th><th>Diagnosis</th></tr>
<tr><td>Out.P</td><td>Output phase loss detected</td></tr>
<tr><td>98</td><td>
The Out.P trip indicates that phase loss has been detected at the drive output. A test can be made for output phase loss when the drive is enabled or the output phase loss condition can be detected while the drive is running as defined by Output Phase Loss Detection Enable (06.059).
<table>
<tr><th>Sub-trip</th><th>Reason</th></tr>
<tr><td>1</td><td>U phase detected as disconnected when drive enabled to run.</td></tr>
<tr><td>2</td><td>V phase detected as disconnected when drive enabled to run.</td></tr>
<tr><td>3</td><td>W phase detected as disconnected when drive enabled to run.</td></tr>
<tr><td>4</td><td>The drive output frequency is above 4 Hz and a phase is disconnected for the time specified by Output Phase Loss Detection Time (06.058).</td></tr>
</table>
NOTE
If Pr 05.042 = 1, the physical output phases are reversed, and so sub-trip 3 refers to physical output phase V and sub-trip 2 refers to physical output phase W.

Recommended actions:
• Check motor and drive connections
• To disable the trip set Output Phase Loss Detection Enable (06.059) = 0
</td></tr>
<tr><td>OV</td><td>DC bus voltage has exceeded the peak level or maximum continuous level for 15 seconds</td></tr>
<tr><td>2</td><td>
The OV trip indicates that the DC bus voltage has exceeded the VM_DC_VOLTAGE[MAX] or VM_DC_VOLTAGE_SET[MAX] for 15 s. The trip threshold varies depending on voltage rating of the drive as shown below.
<table>
<tr><th>Voltage rating</th><th>VM_DC_VOLTAGE [MAX] Frame 1 to 4</th><th>VM_DC_VOLTAGE [MAX] Frame 5 to 9</th><th>VM_DC_VOLTAGE _SET[MAX]</th></tr>
<tr><td>100</td><td>510</td><td>415</td><td>400</td></tr>
<tr><td>200</td><td>510</td><td>415</td><td>400</td></tr>
<tr><td>400</td><td>870</td><td>830</td><td>800</td></tr>
<tr><td>575</td><td>N/A</td><td>990</td><td>955</td></tr>
<tr><td>690</td><td>N/A</td><td>1190</td><td>1150</td></tr>
</table>
Sub-trip Identification
<table>
<tr><th>Source</th><th>xx</th><th>y</th><th>zz</th></tr>
<tr><td>Control system</td><td>00</td><td>0</td><td>01: Instantaneous trip when the DC bus voltage exceeds VM_DC_VOLTAGE[MAX].</td></tr>
<tr><td>Control system</td><td>00</td><td>0</td><td>02: Time delayed trip indicating that the DC bus voltage is above VM_DC_VOLTAGE_SET[MAX].</td></tr>
<tr><td>Power system</td><td>01</td><td>0</td><td>00: Instantaneous trip when the DC bus voltage exceeds VM_DC_VOLTAGE[MAX].</td></tr>
</table>
Recommended actions:
• Increase deceleration ramp (Pr 04)
• Decrease the braking resistor value (staying above the minimum value)
• Check nominal AC supply level
</td></tr>
</table>

<table>
<tr><td></td><td>

- Check for supply disturbances which could cause the DC bus to rise
- Check motor insulation using an insulation tester

</td></tr>
<tr><td>Trip</td><td>Diagnosis</td></tr>
<tr><td>P.dAt</td><td>Power system configuration data error</td></tr>
<tr><td>220</td><td>
The P.dAt trip indicates that there is an error in the configuration data stored in the power system. This trip can be generated from either the drive control system or from the power system. The trip is related to the table uploaded from the power system at power-up.
<table>
<tr><th>Source</th><th>xx</th><th>y</th><th>zz</th><th>Description</th></tr>
<tr><td>Control system</td><td>00</td><td>0</td><td>01</td><td>No data was obtained from the power board.</td></tr>
<tr><td>Control system</td><td>00</td><td>0</td><td>02</td><td>There is no data table.</td></tr>
<tr><td>Control system</td><td>00</td><td>0</td><td>03</td><td>The power system data table is bigger than the space available in the control pod to store it.</td></tr>
<tr><td>Control system</td><td>00</td><td>0</td><td>04</td><td>The size of the table given in the table is incorrect.</td></tr>
<tr><td>Control system</td><td>00</td><td>0</td><td>05</td><td>Table CRC error.</td></tr>
<tr><td>Control system</td><td>00</td><td>0</td><td>06</td><td>The version number of the generator software that produced the table is too low.</td></tr>
<tr><td>Control system</td><td>0</td><td>0</td><td>07</td><td>The power data table failed to be stored in the power board.</td></tr>
<tr><td>Power system</td><td>01</td><td>0</td><td>00</td><td>The power data table used internally by the power module has an error.</td></tr>
<tr><td>Power system</td><td>01</td><td>0</td><td>01</td><td>The power data table that is uploaded to the control system on power up has an error.</td></tr>
<tr><td>Power system</td><td>01</td><td>0</td><td>02</td><td>The power data table used internally by the power module does not match the hardware identification of the power module.</td></tr>
</table>
Recommended actions:

- Hardware fault – Contact the supplier of the drive

</td></tr>
<tr><td>PAd</td><td>Keypad has been removed when the drive is receiving the reference from the keypad</td></tr>
<tr><td>34</td><td>
The PAd trip indicates that the drive is in keypad mode [Reference Selector (01.014) = 4 or 6] and the keypad has been removed or disconnected from the drive.
Recommended actions:

- Re-install keypad and reset
- Change Reference Selector (01.014) to select the reference from another source

</td></tr>
<tr><td>Pb.bt</td><td>Power board is in bootloader mode</td></tr>
<tr><td>245</td><td>
Power board is in bootloader mode
Recommended actions:

- Send power board firmware file to reprogram the power board using Connect and power cycle drive.

</td></tr>
</table>

<table>
<tr><th>Trip</th><th>Diagnosis</th></tr>
<tr><td>Pb.Er</td><td>Communication has been lost / errors detected between control and power processor</td></tr>
<tr><td>93</td><td>The Pb.Er trip is initiated if there is no communications between the control board processor and the power board processor. The reason for the trip can be identified by the sub-trip number.
<table>
<tr><th>Sub-trip</th><th>Reason</th></tr>
<tr><td>1</td><td>PLL operating region out of lock</td></tr>
<tr><td>2</td><td>Power board lost communication with user board</td></tr>
<tr><td>3</td><td>User board lost communication with power board</td></tr>
<tr><td>4</td><td>Communication CRC error</td></tr>
</table>
Recommended actions:
• Hardware fault – Contact the supplier of the drive</td></tr>
<tr><td>Pb.HF</td><td>Power board HF</td></tr>
<tr><td>235</td><td>Power processor hardware fault. The sub-trip number is the HF code.
Recommended actions:
• Hardware fault - Contact the supplier of the drive</td></tr>
<tr><td>Pd.S</td><td>Power down save error</td></tr>
<tr><td>37</td><td>The Pd.S trip indicates that an error has been detected in the power down save parameters saved in non-volatile memory.
Recommended actions:
• Perform a 1001 save in Pr 00 to ensure that the trip doesn’t occur the next time the drive is powered up.</td></tr>
</table>

<table>
<tr><th>Trip</th><th>Diagnosis</th></tr>
<tr><td>PH.Lo</td><td>Supply phase loss</td></tr>
<tr><td>32</td><td>
The PH.Lo trip indicates that the drive has detected an input phase loss or large supply imbalance. The drive will attempt to stop the motor before this trip is initiated. If the motor cannot be stopped in 10 seconds the trip occurs immediately. The PH.Lo trip works by monitoring the ripple voltage on the DC bus of the drive, if the DC bus ripple exceeds the threshold, the drive will trip on PH.Lo. Potential causes of the DC bus ripple are input phase loss, Large supply impedance and severe output current instability.
<table>
<tr><th>Source</th><th>xx</th><th>y</th><th>zz</th></tr>
<tr><td>Control system</td><td>00</td><td>0</td><td>00: Phase loss detected based on control system feedback. The drive attempts to stop the drive before tripping unless bit 2 of Action On Trip Detection (10.037) is set to one.</td></tr>
<tr><td>Power system</td><td>01</td><td>0</td><td>00: Phase loss has been detected by the rectifier module.</td></tr>
</table>
Input phase loss detection can be disabled when the drive is required to operate from the DC supply or from a single phase supply in Input Phase Loss Detection Mode (06.047).

Recommended actions:
• Check the AC supply voltage balance and level at full load
• Check the DC bus ripple level with an isolated oscilloscope
• Check the output current stability
• Check for mechanical resonance with the load
• Reduce the duty cycle
• Reduce the motor load
• Disable the phase loss detection, set Pr 06.047 to 2.
</td></tr>
<tr><td>PSU</td><td>Internal power supply fault</td></tr>
<tr><td>5</td><td>
The PSU trip indicates that one or more internal power supply rails are outside limits or overloaded.
<table>
<tr><th>Source</th><th>xx</th><th>y</th><th>zz</th><th>Description</th></tr>
<tr><td>Control system</td><td>00</td><td>0</td><td rowspan="2">00</td><td rowspan="2">Internal power supply overload.</td></tr>
<tr><td>Power system</td><td>01</td><td>1</td></tr>
</table>
Recommended actions:
• Remove the option module and perform a reset
• There is a hardware fault within the drive – return the drive to the supplier
</td></tr>
</table>

<table>
<tr><th>Trip</th><th>Diagnosis</th></tr>
<tr><td>r.All</td><td>RAM allocation error</td></tr>
<tr><td>227</td><td>The r.All trip indicates that an option module derivative image has requested more parameter RAM than is allowed. The RAM allocation is checked in order of resulting sub-trip numbers, and so the failure with the highest sub-trip number is given. The sub-trip is calculated as (parameter size) + (parameter type) + sub-array number.
<table>
<tr><th>Parameter size</th><th>Value</th></tr>
<tr><td>1 bit</td><td>1</td></tr>
<tr><td>8 bit</td><td>2</td></tr>
<tr><td>16 bit</td><td>3</td></tr>
<tr><td>32 bit</td><td>4</td></tr>
<tr><td>64 bit</td><td>5</td></tr>
</table>
<table>
<tr><th>Parameter type</th><th>Value</th></tr>
<tr><td>Volatile</td><td>0</td></tr>
<tr><td>User save</td><td>1</td></tr>
<tr><td>Power-down save</td><td>2</td></tr>
</table>
Derivatives can customize menus 18 and 20.
<table>
<tr><th>Sub-array</th><th>Menus</th><th>Value</th></tr>
<tr><td>Applications menus</td><td>18-20</td><td>1</td></tr>
<tr><td>Derivative image</td><td>29</td><td>2</td></tr>
<tr><td>Option slot 1 set-up</td><td>15</td><td>4</td></tr>
<tr><td>Option slot 1 applications</td><td>25</td><td>5</td></tr>
</table></td></tr>
<tr><td>r.b.ht</td><td>Hot rectifier/brake</td></tr>
<tr><td>250</td><td>Over-temperature detected on input rectifier or braking IGBT.
Recommended actions:
• Increase ventilation by setting Cooling Fan Control (06.045) > 0.</td></tr>
<tr><td>Reserved</td><td>Reserved trips</td></tr>
<tr><td>01
09
12
14 - 17
23, 29
38 - 39
91, 94 - 96
99
101 - 109
111
168 - 172
176 - 177
190 - 198
205 - 217
222 - 224
229 - 230, 233
238 - 244
249
251 - 254</td><td>These trip numbers are reserved trip numbers for future use.
<table>
<tr><th>Trip Number</th><th>Description</th></tr>
<tr><td>01, 09, 12, 14-17, 23, 29, 38, 39</td><td>Reserved resettable trip</td></tr>
<tr><td>91, 94 -96, 99</td><td>Reserved resettable trip</td></tr>
<tr><td>101 - 109, 111</td><td>Reserved resettable trip</td></tr>
<tr><td>168 - 172, 176 -177</td><td>Reserved resettable trip</td></tr>
<tr><td>190 – 198</td><td>Reserved resettable trip</td></tr>
<tr><td>205 - 217</td><td>Reserved resettable trip</td></tr>
<tr><td>222 - 224</td><td>Reserved non-resettable trip</td></tr>
<tr><td>229 - 230, 233</td><td>Reserved non-resettable trip</td></tr>
<tr><td>238 - 244, 249</td><td>Reserved non-resettable trip</td></tr>
<tr><td>251 - 254</td><td>Reserved non-resettable trip</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Trip</th><th>Diagnosis</th></tr>
<tr><td>rS</td><td>Measured resistance has exceeded the parameter range</td></tr>
<tr><td>33</td><td>
The rS trip indicates that the measured stator resistance of the motor during an auto-tune test has exceeded the maximum possible value of Stator Resistance (05.017).

If the measured value or a value written to this parameter by the user exceeds ($V_{FS}/\sqrt{2}$) / Full Scale Current Kc (11.061), where V_{FS} is the full scale DC bus voltage then this trip is initiated.

The stationary auto-tune is initiated using the auto-tune function (Pr 05.012) or in open loop vector mode (Pr 05.014) on the first run command after power up in mode 4 (Ur_I) or on every run command in modes 0 (Ur_S) or 3 (Ur_Auto). This trip can occur if the motor is very small in comparison to the rating of the drive.

If the value is the result of a measurement made by the drive then sub-trip 0 is applied, or if it is because the parameter has been changed by the user then sub-trip 3 is applied. During the stator resistance section of auto-tuning an additional test is performed to measure the drive inverter characteristics to provide the compensation necessary for dead-times. If the inverter characteristic measurement fails then sub-trip 2 is applied.

The reason for the trip can be identified by the sub-trip number.
<table>
<tr><th>Sub-trip</th><th>Reason</th></tr>
<tr><td>0</td><td>Stator resistance (5.017/21.012) is greater than (V_{FS} / $\sqrt{2}$) / Full Scale Current Kc (11.061), where V_{FS} is the full scale d.c. bus voltage; or the result is = 100 ohms.</td></tr>
<tr><td>2</td><td>The measured Transient Inductance (5.024/21.014) is greater than 500 mH or the measured Stator Inductance (05.025/21.024) is greater than 5000 mH.</td></tr>
<tr><td>3</td><td>A resistance value entered by the user is greater than (V_{FS} / $\sqrt{2}$) / Full Scale Current Kc (11.061), where V_{FS} is the full scale d.c. bus voltage. Clear this trip by setting Stator Resistance (05.017) to a value that is in range and resetting the drive.</td></tr>
<tr><td>4</td><td>The measured stator resistance is not greater than the sub-trip 0 check but is outside the firmware usable range for this drive size.</td></tr>
</table>
Recommended actions:
• Ensure the stator resistance of the motor falls within the range of the drive model. The most likely cause of this trip is trying to measure a motor much smaller than the drive rating. Ratio’s of drive size to motor size of greater than 15:1 are likely to lead to a problem.
• Check that a value has not been entered in the stator resistance for the presently selected motor map that exceeds the allowed range.
• Check the motor cable / connections
• Check the integrity of the motor stator winding using an insulation tester
• Check the motor phase to phase resistance at the drive terminals
• Check the motor phase to phase resistance at the motor terminals
• Ensure the stator resistance of the motor falls within the range of the drive model
• Select fixed boost mode (Pr 05.014 = Fd) and verify the output current waveforms with an oscilloscope
</td></tr>
</table>

<table>
<tr><td></td><td>• Replace the motor</td></tr>
<tr><td>Trip</td><td>Diagnosis</td></tr>
<tr><td>SCL</td><td>Control word watchdog has timed out</td></tr>
<tr><td>30</td><td>The SCL trip indicates that the control word has been enabled and has timed out.
Recommended actions:
• Once Pr 06.042 bit 14 has been changed from 0 to 1 to enable the watchdog, this must be repeated every 1s or a SCL rip will be initiated. The watchdog is disabled when the trip occurs and must be re-enabled if required when the trip is reset.</td></tr>
<tr><td>SL.dF</td><td>Option module in option slot 1 has changed</td></tr>
<tr><td>204</td><td>The SL.dF trip indicates that the option module in option slot 1 on the drive is a different type to that installed when parameters were last saved on the drive. The reason for the trip can be identified by the sub-trip number.
<table>
<tr><th>Sub-trip</th><th>Reason</th></tr>
<tr><td>1</td><td>No module was installed previously</td></tr>
<tr><td>2</td><td>A module with the same identifier is installed, but the set-up menu for this option slot has been changed, and so default parameters have been loaded for this menu.</td></tr>
<tr><td>3</td><td>A module with the same identifier is installed, but the applications menu for this option slot has been changed, and so default parameters have been loaded for this menu.</td></tr>
<tr><td>4</td><td>A module with the same identifier is installed, but the set-up and applications menu for this option slot have been changed, and so default parameters have been loaded for these menus.</td></tr>
<tr><td>>99</td><td>Shows the identifier of the module previously installed.</td></tr>
</table>
Recommended actions:
• Turn off the power, ensure the correct option module is installed in the option slot and re-apply the power.
• Confirm that the currently installed option module is correct, ensure option module parameters are set correctly and perform a user save in Pr mm.000.</td></tr>
<tr><td>SL.Er</td><td>Option module in option slot 1 has detected a fault</td></tr>
<tr><td>202</td><td>The SL.Er trip indicates that the option module in option slot 1 on the drive has detected an error. The reason for the error can be identified by the sub-trip number. As default, the sub-trip number is shown as a number on the display. However, it is possible for the option module to supply sub-trip number strings which will be displayed instead of the number if available.
Recommended actions:
• See relevant option module User Guide for details of the trip</td></tr>
</table>

<table>
<tr><th>Trip</th><th>Diagnosis</th></tr>
<tr><td>SL.HF</td><td>Option module 1 hardware fault</td></tr>
<tr><td>200</td><td>The SL.HF trip is generated by the drive. The possible causes of the trip can be identified by the sub-trip number.
<table>
<tr><th>Sub-trip</th><th>Reason</th></tr>
<tr><td>1</td><td>The module category cannot be identified</td></tr>
<tr><td>2</td><td>All the required customized menu table information has not been supplied or the tables supplied are corrupt</td></tr>
<tr><td>3</td><td>There is insufficient memory available to allocate the comms buffers for this module</td></tr>
<tr><td>4</td><td>The module has not indicated that it is running correctly during drive power-up</td></tr>
<tr><td>5</td><td>Module has been removed after power-up or it has stopped working</td></tr>
<tr><td>6</td><td>The module has not indicated that it has stopped accessing drive parameters during a drive mode change</td></tr>
<tr><td>7</td><td>The module has failed to acknowledge that a request has been made to reset the drive processor</td></tr>
<tr><td>8</td><td>The drive failed to read correctly the menu table from the module during drive power-up.</td></tr>
<tr><td>9</td><td>The drive failed to upload menu tables from the module and timed-out (5s).</td></tr>
<tr><td>10</td><td>Menu table CRC invalid.</td></tr>
</table>
Recommended actions:
• Ensure the option module is installed correctly
• Replace the option module
• Replace the drive</td></tr>
<tr><td>SL.nF</td><td>Option module in option slot 1 has been removed</td></tr>
<tr><td>203</td><td>The SL.nF trip indicates that the option module in option slot 1 on the drive has been removed since the last power up. The sub-trip number gives the ID code of the option module that has been removed.
Recommended actions:
• Ensure the option module is installed correctly.
• Re-install the option module.
• To confirm that the removed option module is no longer required perform a save function in Pr 00.</td></tr>
<tr><td>SL.tO</td><td>Option module watchdog function service error</td></tr>
<tr><td>201</td><td>The SL.tO trip indicates that the option module installed in Slot 1 has started the option watchdog function and then failed to service the watchdog correctly.
Recommended actions:
• Replace the option module</td></tr>
</table>

<table>
<tr><th>Trip</th><th>Diagnosis</th></tr>
<tr><td>So.St</td><td>Soft start relay failed to close, soft start monitor failed</td></tr>
<tr><td>226</td><td>The So.St trip indicates that the soft start relay in the drive failed to close or the soft start monitoring circuit has failed. The cause of the trip can be identified by the sub-trip number.
<table>
<tr><th>Sub-trip</th><th>Reason</th></tr>
<tr><td>1</td><td>Soft-start failure</td></tr>
<tr><td>2</td><td>DC bus capacitor failure on 110 V drive (size 2 only)</td></tr>
</table>
Recommended actions:
• Hardware fault – Contact the supplier of the drive</td></tr>
<tr><td>St.HF</td><td>Hardware trip has occurred during last power down</td></tr>
<tr><td>221</td><td>The St.HF trip indicates that a hardware trip (HF01 –HF18) has occurred and the drive has been power cycled. The sub-trip number identifies the HF trip.
Recommended actions:
• Enter 1299 in Pr 00 and press reset to clear the trip</td></tr>
<tr><td>Sto</td><td>No Safe Torque Off board fitted</td></tr>
<tr><td>234</td><td>STO board not fitted correctly.
Recommended actions:
Hardware fault – Contact the supplier of the drive</td></tr>
<tr><td>th</td><td>Motor thermistor over-temperature</td></tr>
<tr><td>24</td><td>The th trip indicates that the motor thermistor connected to terminal 14 (digital input 5) on the control connections has indicated a motor over temperature. If digital input 5 mode (08.035) is 2 then a th trip is initiated if the feedback value is higher than Thermistor Trip Threshold (07.048).
Recommended actions:
• Check motor temperature
• Check threshold level (Pr 07.048).
• Check thermistor continuity</td></tr>
<tr><td>th.br</td><td>Brake resistor over temperature</td></tr>
<tr><td>10</td><td>The th.br trip is initiated if the hardware based braking resistor thermal monitoring is connected and the resistor overheats. If the braking resistor is not used, then this trip must be disabled with bit 3 of Action On Trip Detection (10.037) to prevent this trip.
Recommended actions:
• Check brake resistor wiring
• Check braking resistor value is greater than or equal to the minimum resistance value
• Check braking resistor insulation</td></tr>
</table>

<table>
<tr><th>Trip</th><th>Diagnosis</th></tr>
<tr><td>tH.Fb</td><td>Internal thermistor has failed</td></tr>
<tr><td>218</td><td>The tH.Fb trip indicates that an internal thermistor has failed in the drive (i.e. open circuit or short circuit). The thermistor location can be identified by the sub-trip number.
<table>
<tr><th>Source</th><th>xx</th><th>y</th><th>zz</th></tr>
<tr><td>Power system</td><td>01</td><td>0</td><td>Thermistor location defined by zz</td></tr>
<tr><td>Power system</td><td>01</td><td>1</td><td>Thermistor location defined by zz in the rectifier.</td></tr>
</table>
Recommended actions:
• Hardware fault – Contact the supplier of the drive</td></tr>
<tr><td>thS</td><td>Motor thermistor short circuit</td></tr>
<tr><td>25</td><td>The thS trip indicates that the motor thermistor connected to terminal 14 (digital input 5) on the control connections, is short circuit or low impedance (<50 Ω).
Recommended actions:
• Check thermistor continuity
• Replace motor / motor thermistor</td></tr>
<tr><td>tun.S</td><td>Autotune test stopped before completion</td></tr>
<tr><td>18</td><td>The drive was prevented from completing an autotune test, because either the drive enable or the drive run were removed.
Recommended actions:
• Check the drive enable signal (Terminal 31 & 34 on size 1 to 4 or terminals 31 & 35 on size 5 to 9) were active during the autotune.
• Check the run command was active in digital input 3 or 4 state (Pr 08.003 or Pr 08.004) during the autotune.</td></tr>
<tr><td>tun.1</td><td>Required speed could not be reached</td></tr>
<tr><td>11</td><td>The drive has tripped during an autotune. The cause of the trip can be identified from the sub-trip number.
<table>
<tr><th>Sub-trip</th><th>Reason</th></tr>
<tr><td>2</td><td>The motor did not reach the required speed during rotating autotune or mechanical load measurement</td></tr>
</table>
Recommended actions:
• Ensure the motor is free to turn i.e. mechanical brake is released
• Ensure Mechanical Load Test Level (05.021) is set correctly</td></tr>
<tr><td>tun.3</td><td>Measured inertia has exceeded the parameter range (RFC-A mode only)</td></tr>
<tr><td>13</td><td>The drive has tripped during a rotating autotune or mechanical load measurement test. The cause of the trip can be identified from the associated sub-trip number.
<table>
<tr><th>Sub-trip</th><th>Reason</th></tr>
<tr><td>1</td><td>Measured inertia has exceeded the parameter range during a mechanical load measurement</td></tr>
<tr><td>3</td><td>The mechanical load test has been unable to identify the motor inertia</td></tr>
</table>
Recommended actions:</td></tr>
</table>

	• Check motor cable wiring is correct
Trip	**Diagnosis**
U.OI	**User OI ac**
8	A U.OI trip is initiated if the output current of the drive exceeds the trip level set by User Over Current Trip Level (04.041).
U.S	**User Save error / not completed**
36	The U.S trip indicates that an error has been detected in the user save parameters saved in non-volatile memory. For example, following a user save command, If the power to the drive was removed when the user parameters were being saved. **Recommended actions:** • Perform a user save in Pr 00 to ensure that the trip doesn't occur the next time the drive is powered up. • Ensure that the drive has enough time to complete the save before removing the power to the drive.
UP.uS	**Trip generated by an onboard user program**
96	This trip can be initiated from within an onboard user program using a function call which defines the sub-trip number. **Recommended actions:** • Check the user program

Trip	Diagnosis
UPrG	**Onboard user program error**
249	An error has been detected in the onboard user program image. The sub-trip indicated the reason for the trip.

Sub trip	Reason	Comments
1	Divide by zero.	
2	Undefined trip.	
3	Attempted fast parameter access set-up with non-existent parameter.	
4	Attempted access to non-existent parameter.	
5	Attempted write to read-only parameter.	
6	Attempted an over-range write.	
7	Attempted read from write-only parameter.	
30	The image has failed because either its CRC is incorrect, or there are less than 6 bytes in the image or the image header version is less than 5.	Occurs when the drive powers-up or the image is programmed. The image tasks will not run.
31	The image requires more RAM for heap and stack than can be provided by the drive.	As 30.
32	The image requires an OS function call that is higher than the maximum allowed.	As 30.
33	The ID code within the image is not valid.	As 30.
34	The user program image has been changed for an image with a different user program number.	As 30.
40	The timed task has not completed in time and has been suspended.	Onboard User Program: Enable (11.047) is reset to zero when the trip is initiated.
41	Undefined function called, i.e. a function in the host system vector table that has not been assigned.	As 40.
52	Customizable menu table CRC check failed.	As 30.
53	Customizable menu table changed.	Occurs when the drive powers-up or the image is programmed and the table has changed. Defaults are loaded for the user program menu and the trip will keep occurring until drive parameters are saved.
80	*Image is not compatible with the control board	Initiated from within the image code.
81	*Image is not compatible with the control board serial number	
100	Image has detected and prevented attempted pointer access outside of the IEC task's heap area.	
101	Image has detected and prevented misaligned pointer usage.	
102	Image has detected an array bounds violation and prevented its access.	
103	Image has attempted to convert a data type to or from an unknown data type, has failed and has shut itself down.	
104	Image has attempted to use an unknown user service function.	

200	User program has invoked a "divide" service with a denominator of zero. (Note that this is raised by the downloaded image and has therefore been given a distinct error code despite being the same fundamental problem as sub-trip 1.)	
201	Parameter access is not supported. An attempt to read database other than the host drive.	
202	Parameter does not exist. Database was host drive but the specified parameter does not exist.	
203	Parameter is read-only.	
204	Parameter is write-only.	
205	Unknown parameter error.	
206	Invalid bit present in parameter. The parameter does not contain the specified bit.	
207	Parameter format lookup failed. Failed to get parameter information data.	
208	An over-range write has been attempted.	

The following table shows the differences when compared to the derivative product image.

Sub-trip	Difference
40,41	Onboard User Program: Enable (11.047) is reset to zero when the trip is initiated.
51	Not applicable as core menu Customization not allowed.
6x	Not applicable as option module restrictions not allowed.
7x	Not applicable as option module restrictions not allowed.
100	Image has detected and prevented attempted pointer access outside of the IEC task's heap area.
101	Image has detected and prevented misaligned pointer usage.
102	Image has detected an array bounds violation and prevented its access.
103	Image has attempted to convert a data type to or from an unknown data type, has failed and has shut itself down.
104	Image has attempted to use an unknown user service function.
200	User program has invoked a "divide" service with a denominator of zero. (Note that this is raised by the downloaded image and has therefore been given a distinct error code despite being the same fundamental problem as sub-trip 1)

Table Serial communications look up table

No	Trip	No	Trip	No	Trip
1	rES	90	LF.Er	199	dESt
2	OV	91	rES	200	SL.HF
3	OI.AC	92	OI.Sn	201	SL.tO
4	OI.br	93	Pb.Er	202	SL.Er
5	PSU	94 – 95	rES	203	SL.nF
6	Et	96	UP.uS	204	SL.dF
7	O.SPd	97	d.Ch	205 – 214	rES
8	U.OI	98	Out.P	215	rES
9	rES	99	rES	216 – 217	rES
10	th.br	100	rESEt	218	tH.Fb
11	tun.1	101	rES	219	Oht.C
12	rES	102	rES	220	P.dAt
13	tun.3	103 – 108	rES	221	St.HF
14 – 17	rES	109	rES	222	rES
18	tun.S	110	dcct	223 – 224	rES
19	It.br	111	rES	225	Cur.O
20	It.Ac	112 – 167	t112 - t167	226	So.St
21	Oht.I	168 – 172	rES	227	r.All
22	Oht.P	173	FAn.F	228	OI.SC
23	rES	174	C.SL	229	rES
24	th	175	C.Pr	230	rES
25	thS	176	rES	231	Cur.c
26	O.Ld1	177	rES	232	dr.CF
27	Oh.dc	178	C.by	233	rES
28	cL.A1	179	C.d.E	234	Sto
29	rES	180	C.OPt	235	Pb.HF
30	SCL	181	C.rdo	236	no.PS
31	EEF	182	C.Err	237	FI.In
32	PH.Lo	183	C.dAt	238 – 244	rES
33	rS	184	C.Ful	245	Pb.bt
34	PAd	185	C.Acc	246	dEr.E
35	CL.bt	186	C.rtg	247	Fi.Ch
36	U.S	187	C.tyP	248	dEr.I
37	Pd.S	188	C.cPr	249	UPrG
38	rES	189	OI.A1	250	r.b.ht
39	rES	190	rES	251 – 254	rES
40 - 89	t040 - t089	191 - 198	rES	255	rSt.L

The trips can be grouped into the following categories. It should be noted that a trip can only occur when the drive is not tripped or is already tripped but with a trip with a lower priority number.

Table Trip categories

Priority	Category	Trips	Comments
1	Internal faults	HFxx	These indicate internal problems and cannot be reset. All drive features are inactive after any of these trips occur.
1	Stored HF trip	{St.HF}	This trip cannot be cleared unless 1299 is entered into Parameter 00 and a reset is initiated.
2	Non-resettable trips	Trip numbers 218 to 247, {SL.HF}	These trips cannot be reset.
3	Volatile memory failure	{EEF}	This can only be reset if Parameter 00 is set to 1233 or 1244, or if Load Defaults (11.043) is set to a non-zero value.
4	NV Media Card trips	Trip numbers 174, 175 and 177 to 188	These trips are priority 5 during power-up.
4	Internal 24V	{PSU}	Rectifier 24V
5	Trips with extended reset times	{OI.AC}, {OI.br} and {FAn.F}	These trips cannot be reset until 10 s after the trip was initiated.
5	Phase loss and d.c. link power circuit protection	{PH.Lo} and {Oh.dc}	The drive will attempt to stop the motor before tripping if a {PH.Lo} trip occurs unless this feature has been disabled (see Action On Trip Detection (10.037). The drive will always attempt to stop the motor before tripping if an {Oh.dc} occurs.
5	Standard trips	All other trips	

Internal / Hardware trips

Trips {HF01} to {HF23} are internal faults that do not have trip numbers except HF08, HF11, HF12 & HF18. If one of these trips occurs, the main drive processor has detected an irrecoverable error. All drive functions are stopped and the trip message will be displayed on the drive keypad. If a non permanent trip occurs this may be reset by power cycling the drive. On power up after it has been power cycled the drive will trip on St.HF (the sub-trip number indicates the HF fault code). Enter 1299 in Pr 00 to clear the Stored HF trip.

Alarm indications

In any mode, an alarm is an indication given on the display by alternating the alarm string with the drive status string display. If an action is not taken to eliminate any alarm except "tuning", “LS" and “24.LoSt” the drive may eventually trip. Alarms are not displayed when a parameter is being edited.

Table Alarm indications

Alarm string	Description
br.res	Brake resistor overload. Braking Resistor Thermal Accumulator (10.039) in the drive has reached 75.0 % of the value at which the drive will trip.
OV.Ld	Motor Protection Accumulator (04.019) in the drive has reached 75.0 % of the value at which the drive will trip and the load on the drive is >100 %.
d.OV.Ld	Drive over temperature. Percentage Of Drive Thermal Trip Level (07.036) in the drive is greater than 90 %.
tuning	The autotune procedure has been initialized and an autotune in progress.
LS	Limit switch active. Indicates that a limit switch is active and that is causing the motor to be stopped.
Opt.AI	Option slot alarm.
Lo.AC	Low voltage mode. See Low AC Alarm (10.107).
I.AC.Lt	Current limit active. See Current Limit Active (10.009).
24.LoSt	24V Backup not present. See 24V Alarm Loss Enable (11.098).

Status indications

Table Status indications

String	Description	Drive output stage
inh	The drive is inhibited and cannot be run. The Safe Torque Off signal is not applied to Safe Torque Off terminals or Pr 06.015 is set to 0.	Disabled
rdy	The drive is ready to run. The drive enable is active, but the drive inverter is not active because the final drive run is not active.	Disabled
Stop	The drive is stopped / holding zero speed.	Enabled
S.Loss	Supply loss condition has been detected.	Enabled
dc.inj	The drive is applying dc injection braking.	Enabled
Er	The drive has tripped and no longer controlling the motor. The trip code appears in the display.	Disabled
UV	The drive is in the under voltage state either in low voltage or high voltage mode.	Disabled
HEAt	The motor pre-heat function is active	Enabled

Table Option module and other status indications at power-up

String	Status
PS.LOAD	Waiting for power stage.
The drive is waiting for the processor in the power stage to respond after power-up.	
LOAD OPtion	Waiting for an option module
The drive is waiting for the option module to respond after power-up.	
UPLOAD	Loading parameter database
At power-up it may be necessary to update the parameter database held in the drive because an Option module has changed. This may involve data transfer between the drive and option module. During this period 'UPLOAD' is displayed.	
LOAD.I	Bootloading drive firmware
The drive is waiting for the bootloader file to be transferred to the processor.	

Displaying the trip history

The drive retains a log of the last ten trips that have occurred. Trip 0 (10.020) to Trip 9 (10.029) store the most recent 10 trips that have occurred where Trip 0 (10.020) is the most recent and Trip 9 (10.029) is the oldest. When a new trip occurs it is written to Trip 0 (10.020) and all the other trips move down the log, with oldest being lost. The date and time when each trip occurs are also stored in the date and time log, i.e. Trip 0 Date (10.041) to Trip 9 Time (10.060). The date and time are taken from Date (06.016) and Time (06.017). Some trips have sub-trip numbers which give more detail about the reason for the trip. If a trip has a sub-trip number its value is stored in the sub-trip log, i.e. Trip 0 Sub-trip Number (10.070) to Trip 9 Sub-trip Number (10.079). If the trip does not have a sub-trip number then zero is stored in the sub-trip log.

If any parameter between Pr 10.020 and Pr 10.029 inclusive is read by serial communication, then the trip number in Table Trip indications is the value transmitted.

NOTE

The trip logs can be reset by writing a value of 255 in Pr 10.038 (via serial communications only).

Behaviour of the drive when tripped

If the drive trips, the output of the drive is disabled so the load coasts to a stop. If any trip occurs, the following read only parameters are frozen until the trip is cleared. This is to help diagnose the cause of the trip.

Parameter	Description
01.001	Frequency reference
01.002	Pre-skip filter reference
01.003	Pre-ramp reference
01.069	Reference in rpm
01.070	Clamped reference
02.001	Post-ramp reference
03.001	Final demand ref
03.002	Estimated frequency
03.003	Frequency error
03.004	Frequency controller output
03.045	Frequency reference
04.001	Current magnitude
04.002	Active current
04.017	Reactive current
05.001	Output frequency
05.002	Output voltage
05.003	Power
05.005	DC bus voltage
07.001	Analog input 1
07.002	Analog input 2

If the parameters are not required to be frozen then this can be disabled by setting bit 4 of Pr 10.037.

SECTION 7

PARTS LIST

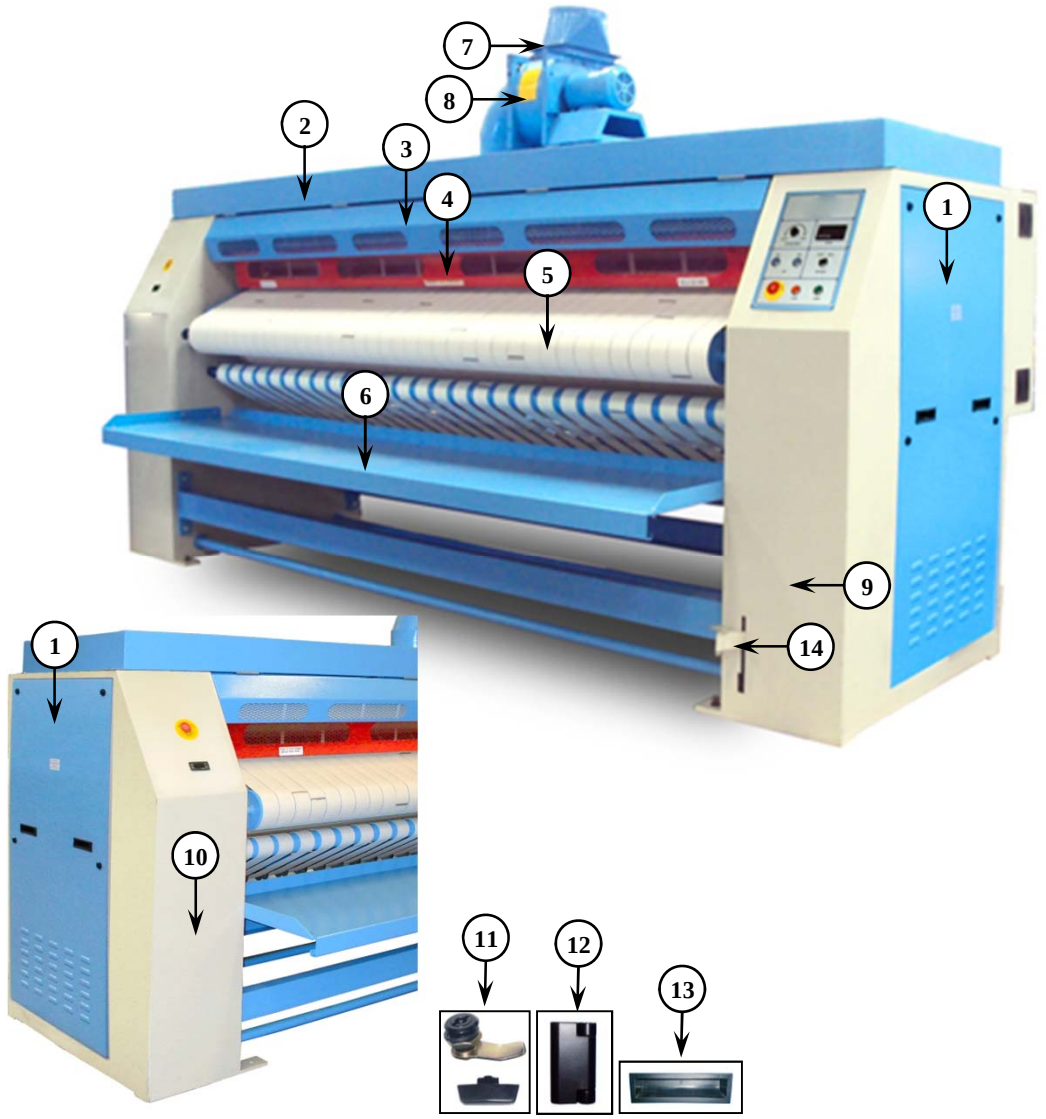
ORDERING SPARE PARTS

In case spare parts are needed, please include the following information with your order:

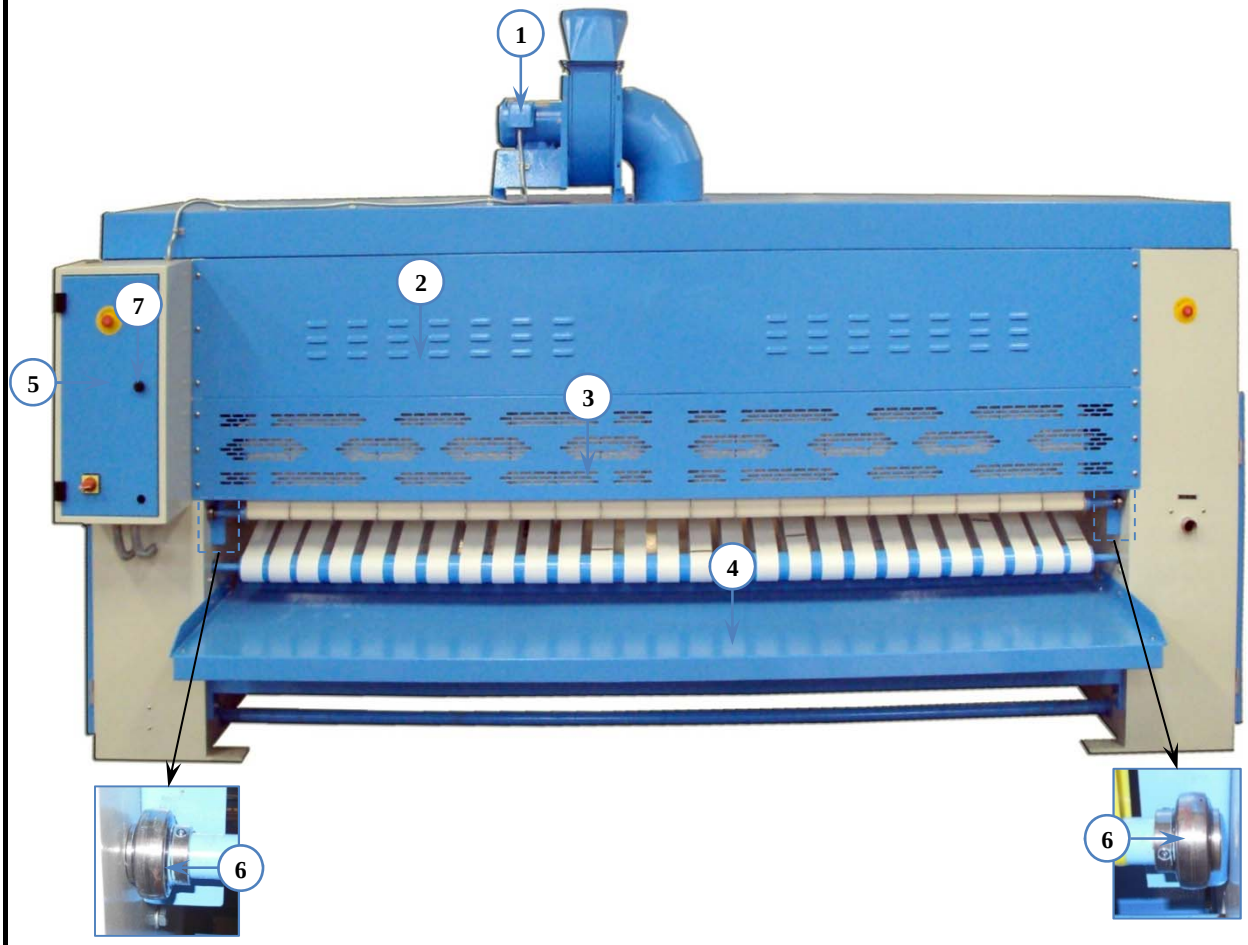
1. Model and serial number of the equipment (located on the name plate).
2. Part number, part name, and quantity required. Use this manual to facilitate ordering.
3. When ordering electrical motors, please include complete name plate data, motor manufacturer, and wiring diagram number.

Our service and spare parts department consists of specially trained personnel to assist you with your needs. Please do not hesitate to call if we can be of any assistance to you.

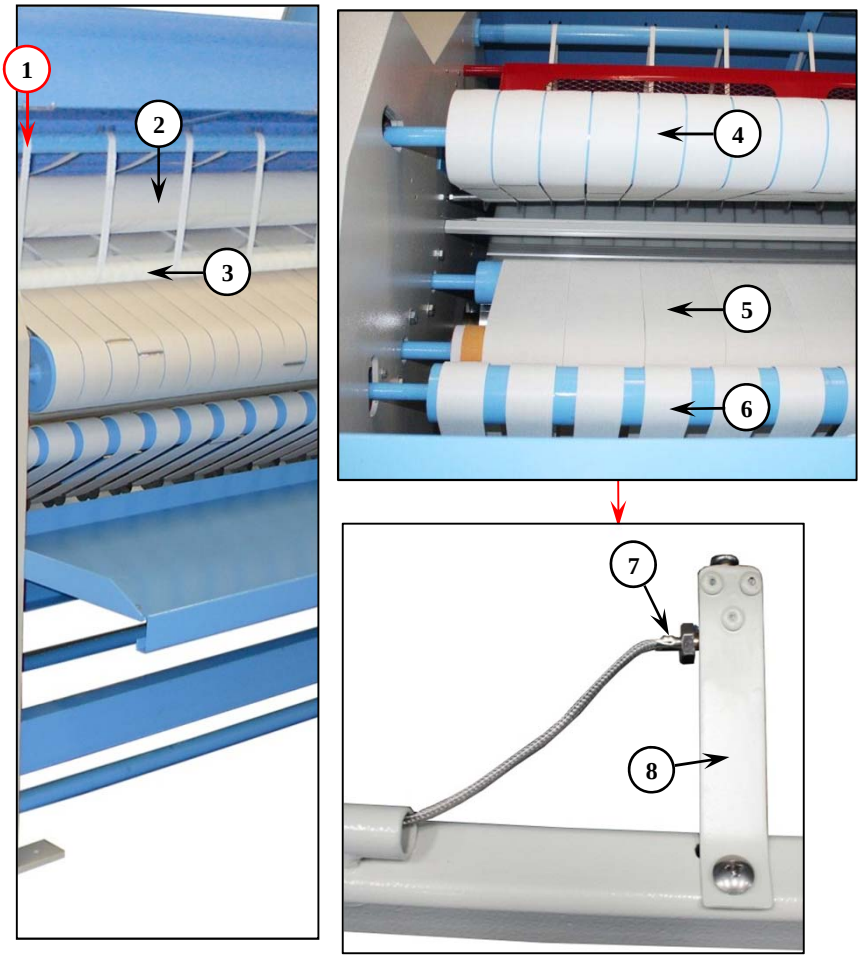
Section 7	Parts List: Front Panel Assembly	Page 1



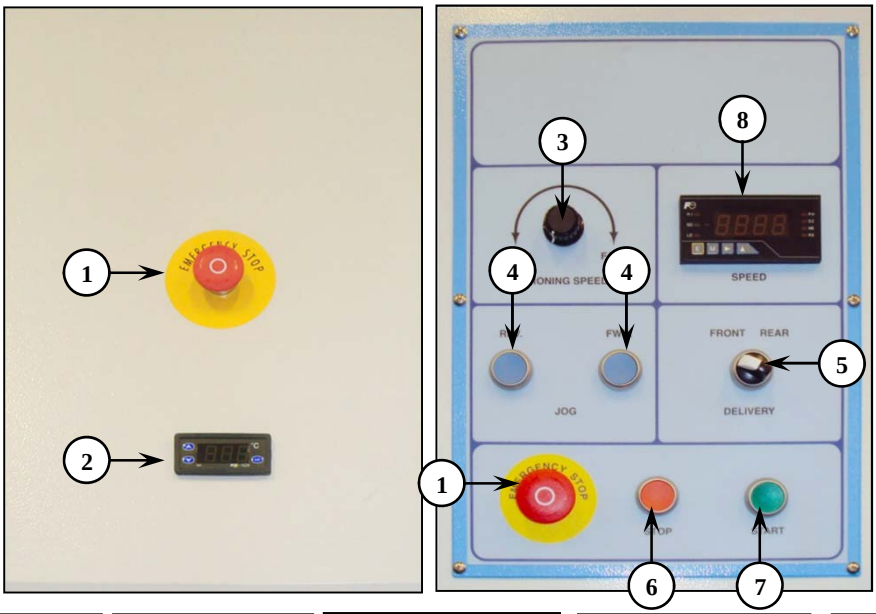
Item	Part No.	Qty.	Description
1	A3-S024-090	2	Right/Left panel assembly (Color : PU-0121)
2	A3-S024-004	1	Canopy complete (PU-0121)
3	A3-S024-046	1	Cover, Feed ribbon drive roll, Front (PU-0121)
4	A3-S024-051	1	Guard, Safety finger
5	A3-S024-040	1	Feed table
6	A3-S024-007	1	Receiving shelf, Front (PU-0121)
7	A3-S024-006	1	Round to square (PU-0121)
8	A3-S024-005	1	Elbow (PU-0121)
9	A3-S024-094	1	End frame, Left(Color Paint White)
10	A3-S024-095	1	End frame, Right(Color Paint White)
11	A0-A013-010	10	Key
	A0-A013-011	10	Master Key
12	A0-A029-005	2	Hinge, Offset panel door
13	A0-A086-005	4	Door handle
14	A0-A001-025	1	Rubber pedal roller

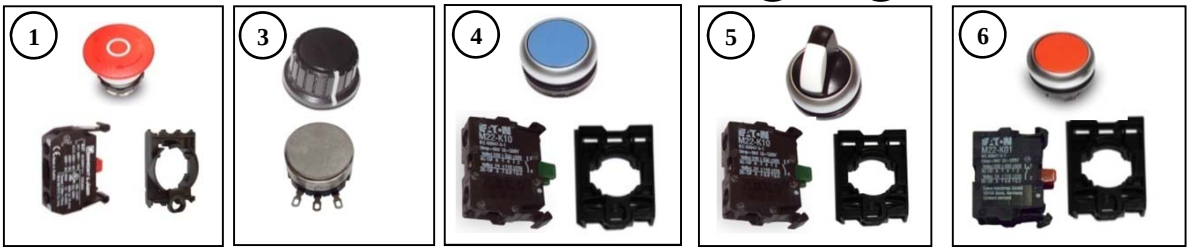


Item	Part No.	Qty.	Description
1	A0-E008-034	1	Blower Forward Curve Motor 2 HP. 4P.
2	A3-S024-068	1	Rear Side Panel Assembly, Top (PU-0121)
3	A3-S024-069	1	Rear Side Panel Assembly, Lower (PU-0121)
4	A3-S024-016	1	Receiving shelf, Rear (PU-0121)
5	A0-A050-001	1	Electrical box
6	A0-A004-100	2	Y-Bearing (With Grub Screw Locking)
7	A0-A086-003	1	Plastic Knob Screw

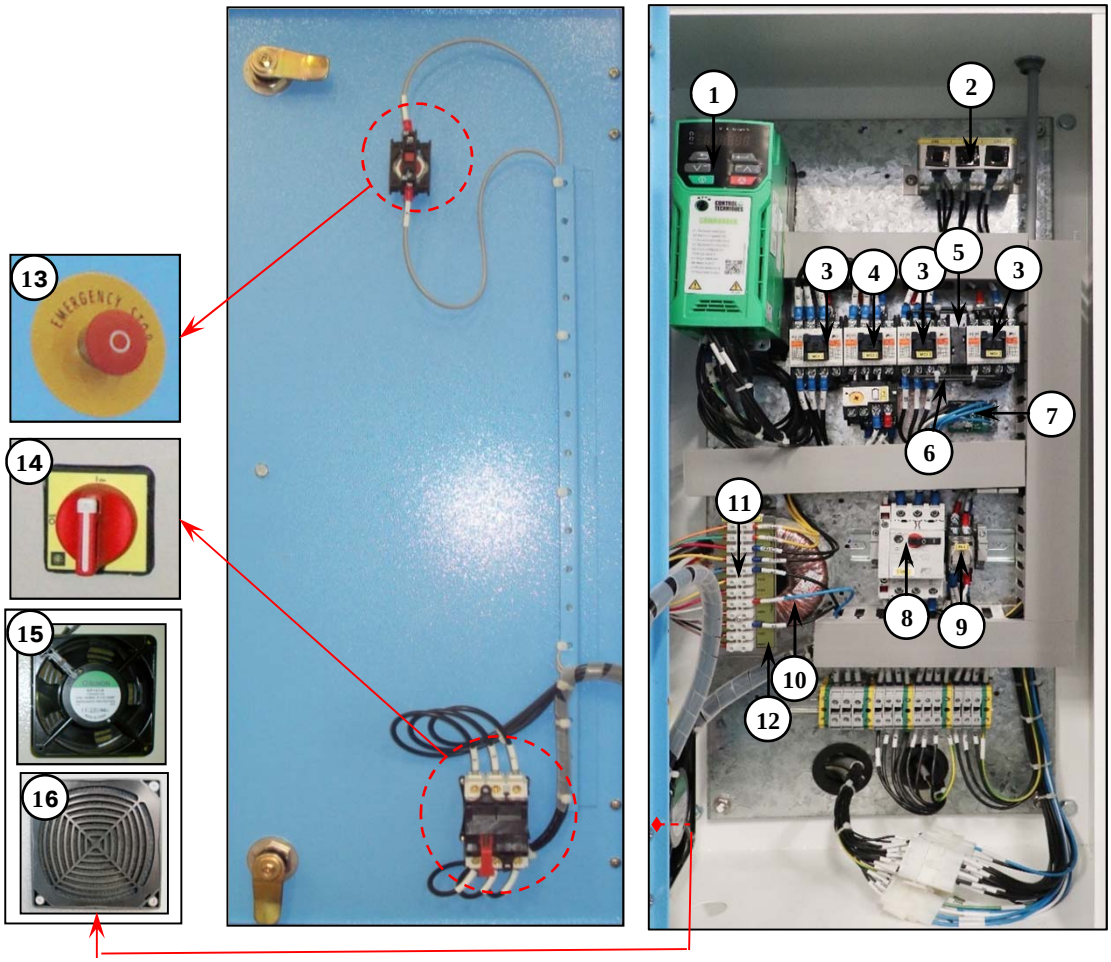


Item	Part No.	Qty.	Description
1	A0-A002-177	1	Ribbon, Guide Tape Polyester Size. 3/4"
2	A0-A047-001-03	1	Pressure Roll Padding Polyester & Cotton
	A0-X025-111-04	1	West Point Fabric 3200mm.
3	A0-A084-001-01	1	Duffer Roll Padding Cover
	A3-S024-039	1	Doffer roll
4	A0-A002-105-05	38	Belt, Polyester 3"(Feed)
5	A0-A002-561-05	19	Belt, Aramid / Polyester. 6"
6	A0-A002-105-25	27	Belt, Polyester 3" (Delivery)
7	A0-E027-054	1	Thermocouple
8	A3-SIP1-003	1	Support Thermocouple

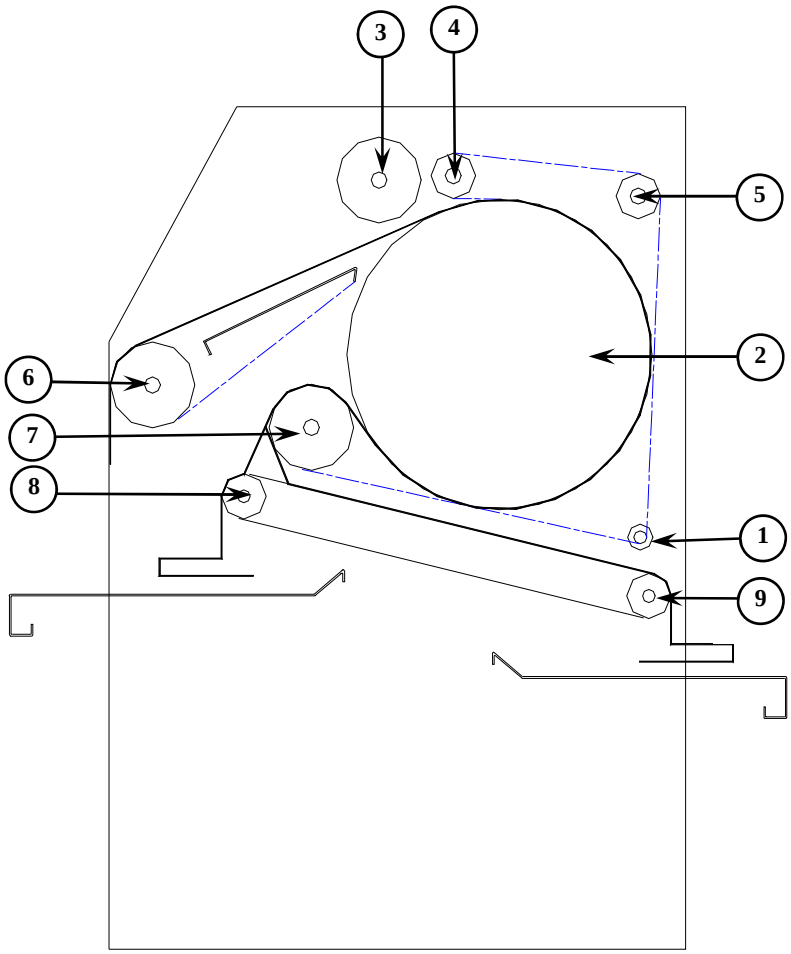




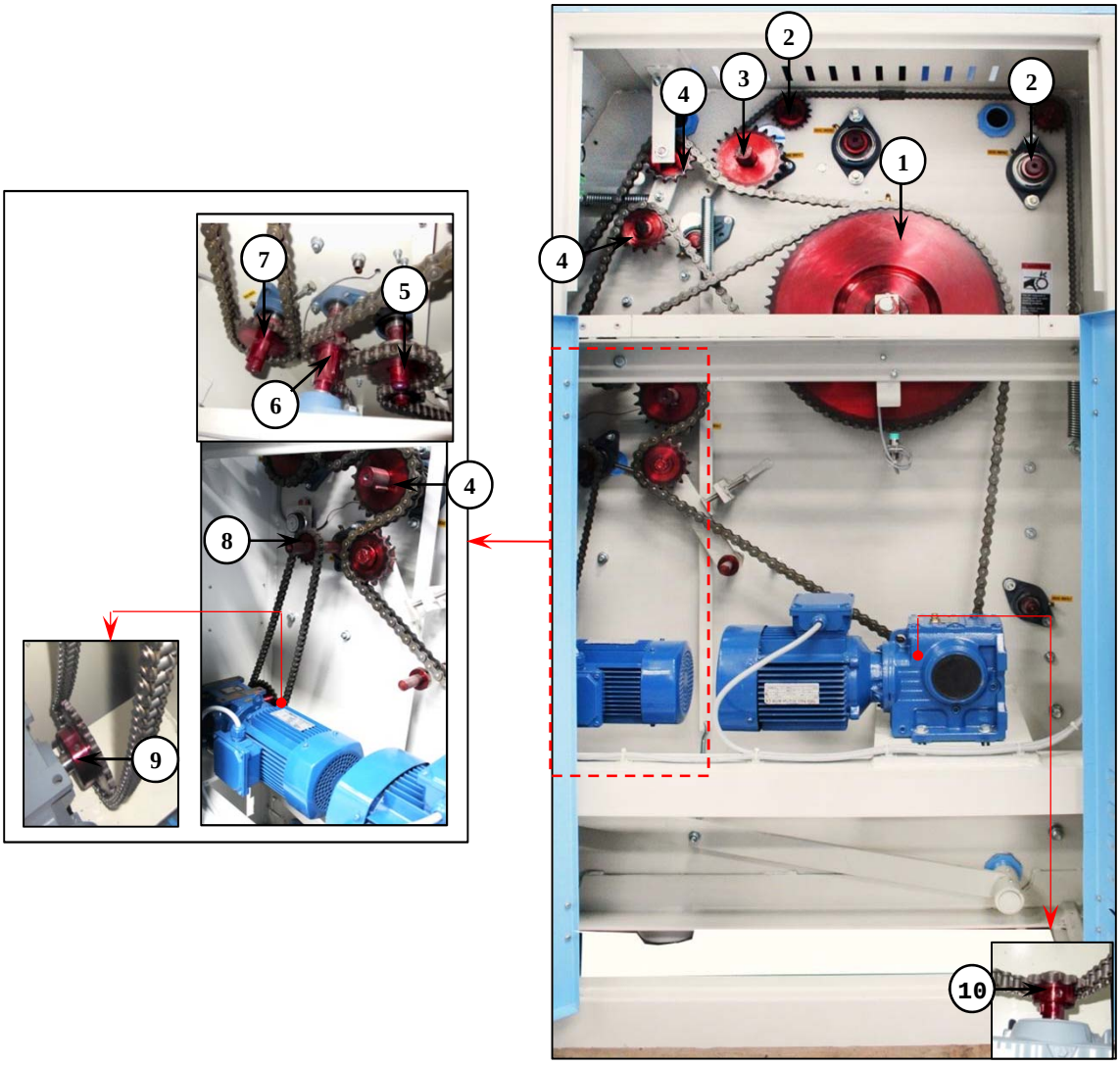
Item	Part No.	Qty.	Description
1	A0-E032-022	2	Emergency stop button
	A0-E032-023	2	Connector Base, E-Stop
	A0-E032-024	2	Contact Block, N.C, E-Stop
2	A0-E027-008	1	Temperature Controller
3	A0-E038-009	1	Knob, Speed Control Adjustor
	A0-E038-010	1	Speed Volume Adjust
4	A0-E032-067	2	Push button switch for jog reverse,forward
	A0-E032-092	2	Contact Block
	A0-E032-093	2	Fixing Adapter
5	A0-E033-029	1	Selection Switch Actuator
	A0-E032-092	2	Contact Block
	A0-E032-093	1	Fixing Adapter
6	A0-E032-069	1	Push button switch for stop
	A0-E032-094	1	Contact Block
	A0-E032-093	1	Fixing Adapter
7	A0-E032-222	1	Push button switch for start
8	A0-E028-088	1	Frequency Rate Meter 24VAC/DC



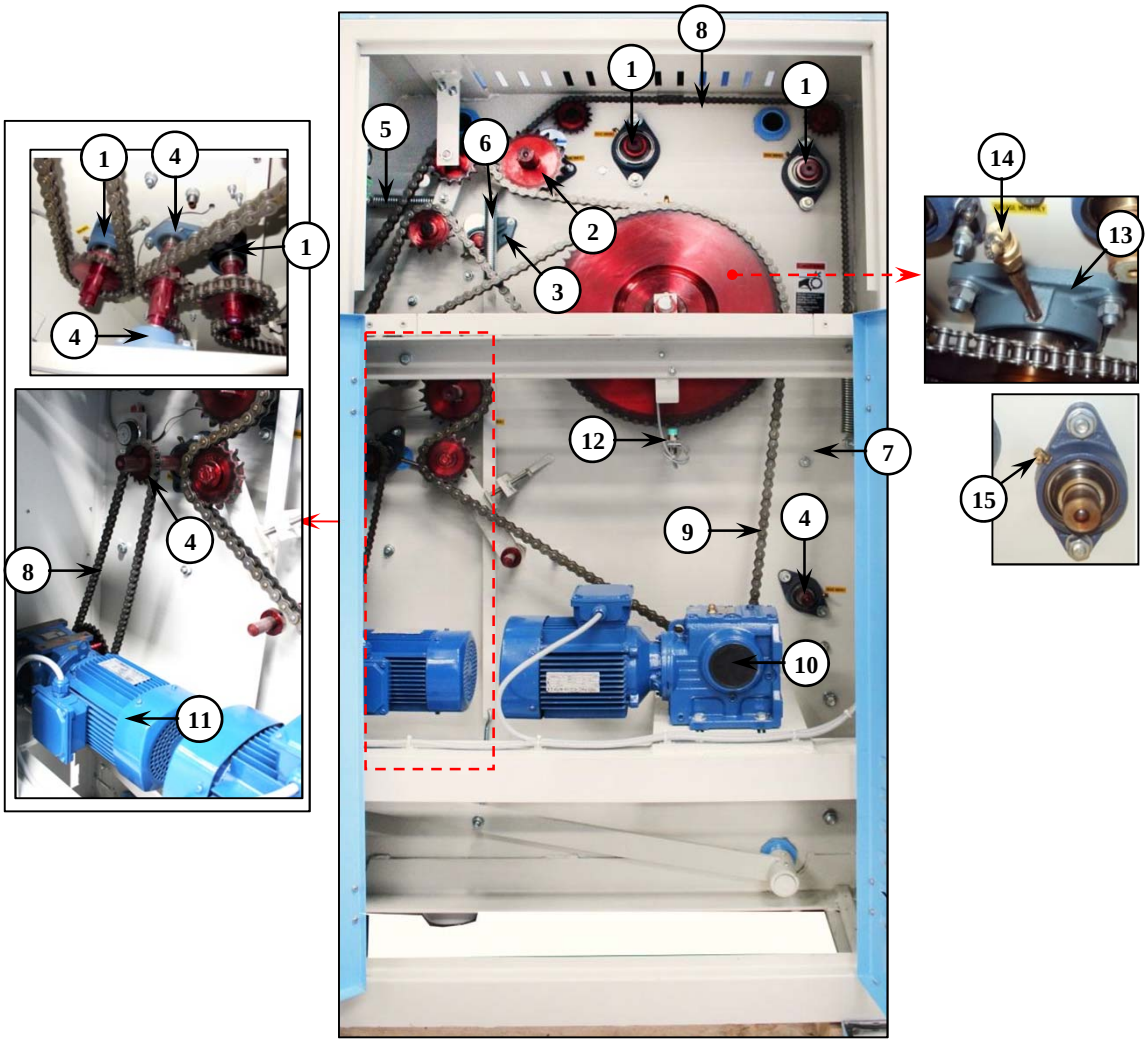
Item	Part No.	Qty.	Description
1	A0-E001-353	1	Inverter 2HP. (1.5kW.) 380-480V. 3PH. 50/60Hz.
2	A0-E010-029	1	Circuit Breaker 6A
	A0-E010-035	2	Circuit Breaker 2A
3	A0-E004-065	3	Magnetic Contactor
4	A0-E004-065	1	Magnetic Contactor
	A0-E025-053	1	Overload Over Load 2.8-4.2 Amp.
5	A0-E036-006	1	Mechanical interlock
6	A0-E036-007	1	Power connection kit for reversing
7	A0-E007-319	1	Power Supply 24VDC.
8	A0-E010-077	1	Circuit Breaker 1.6-2.5 A.
	A0-E024-015	1	Auxiliary Contact
9	A0-E009-001	1	Relay
	A0-E009-020	1	Socket Relay
10	A0-E006-074	1	Transformer, Toroidal, Rating: 150VA.
11	A0-E021-039	1	Terminal, Block 10P
12	A0-A090-130	1	Decal For Transformer Terminal Block
13	A0-E045-002	1	Vario Load Break S.W.
14	A0-E012-009	2	Fan, Filter size 4-1/2"X4-1/2"
15	A0-E012-008	1	Fan, Cooling size 4-1/2" 115 VAC
16	A0-E032-022	2	Emergency stop button
	A0-E032-024	2	Contact block, N.C, E-Stop
	A0-E032-023	2	Contactor base, E-Stop



Item	Part No.	Qty.	Description
1	A3-S024-028	1	Guide assembly (6" ribbon)
2	A3-S024-029	1	Heated roll 24"
3	A3-S024-030	1	Roller, Compression
4	A3-S024-031	1	Roller, Idler (6" ribbon, Front upper)
5	A3-S024-032	1	Roller, Idler (6" ribbon, Rear upper)
6	A3-S024-033	1	Roller, Drive (Feed ribbon)
7	A3-S024-034	1	Roller, Drive (6" ribbon)
8	A3-S024-035	1	Roller, Drive (Delivery ribbon, Front)
9	A3-S024-036	1	Roller, Idler (Delivery ribbon, Rear)

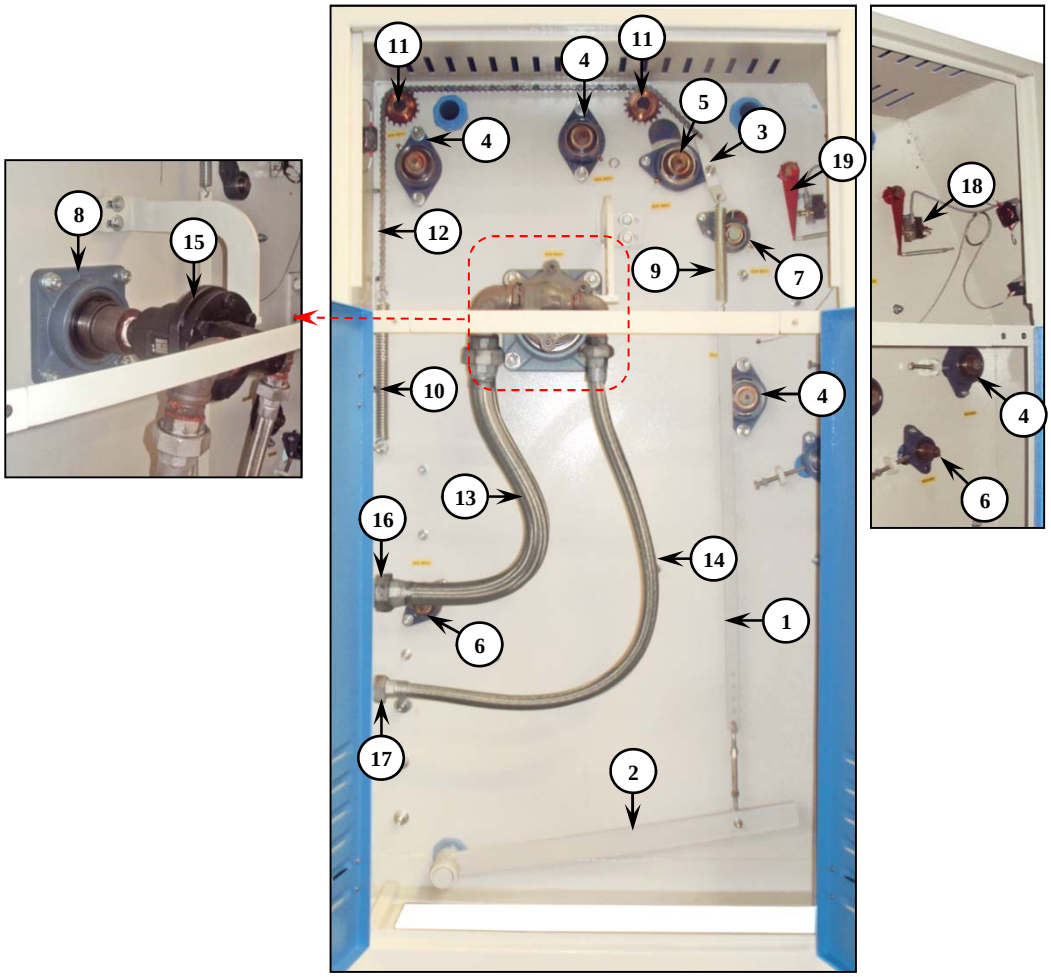


Item	Part No.	Qty.	Description
1	A0-M001-020-01	1	Double Sprocket No.60-2,70T
2	A0-M001-083	2	Sprocket No.40, 18T
3	A0-M001-019-01	1	Sprocket No.60, 21T
4	A0-M001-500	3	Sprocket No.60, 15T
5	A0-M001-018-02	1	Sprocket No.60, 20T
6	A0-M001-014-02	1	Sprocket No.60, 14T
7	A0-M001-053-01	1	Sprocket No.60, 22T
8	A0-M001-026-01	1	Sprocket No.40,16T
9	A0-M001-025	1	Sprocket No.40, 28T
10	A0-M001-024	1	Sprocket No.60, 13T



Item	Part No.	Qty.	Description
1	A0-A004-025	4	Y-Bearing Flanged Unit+Housing
2	A0-A004-025-03	1	Y-Bearing Flanged Unit+Housing
3	A0-A004-122	1	Y-Bearing With Grub Screw Locking
4	A0-A004-027	4	Y-Bearing Flanged Unit+Housing
5	A0-A008-023	1	Spring tensioner
6	A0-A008-024	1	Spring, Compression roll lever
7	A0-A008-025	1	Spring, Compression roll chain
8	A0-A051-004	2	Single chain (For compression roll lever)
9	A0-A051-006	1	Single chain (For main drive)
10	A0-E008-376	1	Helical Worm Gear Motor (50Hz)
	A0-E008-377	1	Helical Worm Gear Motor(60Hz)
11	A0-E008-040	1	Helical Worm Gear Motor (50Hz)
	A0-E008-045	1	Helical Worm Gear Motor (60Hz)
12	A0-E023-009	1	Proximity sensor (For speed)
13	A0-A004-215	1	Y-Bearing Flanged Unit+Housing
14	A0-A024-003	1	Grease Fitting Elbow 45° 1/8"
15	A0-A024-016	18	Grease Fitting Elbow 45° 1/4"

Section 7	Part List: Sprocket and Bearing,Right Side Door	Page 9



Item	Part No.	Qty.	Description
1	A3-S024-020	2	Bar, Vertical linkage
2	A3-S024-024	1	Lever, Compression roll, Right end
3	A3-S024-025	1	Bar, Pivot, Compression roll lever
4	A0-A004-025	4	Y-Bearing Flanged Unit+Housing
5	A0-A004-025-03	1	Bearing Swivel Position With Hinge Bush Brass
6	A0-A004-027	2	Y-Bearing Flanged Unit+Housing
7	A0-A004-122	1	Y-Bearing With Grub Screw Locking
8	A0-A004-215	1	Y-Bearing Flanged Unit+Housing
9	A0-A008-024	1	Spring, Compression roll lever
10	A0-A008-025	1	Spring, Compression roll chain
11	A0-M001-083	1	Sprocket, Dia.16mm., 18T
12	A0-A051-004	1	Single chain No.40 (For compression roll lever)
13	A0-A017-111	1	Flexible steam pipe (1-1/4"X750mm.)
14	A0-A017-112	1	Flexible steam pipe (3/4"X1100mm.)
15	A0-A012-003	1	Rotary Joints (1-1/2")
	A0-A096-045	1	Fitting Bushing Brass
	A0-A111-009-013	1	Tube,Copper,OD.5/8
16	A0-A011-014	1	Nipple Steam 3/4"
17	A0-A011-019	1	Nipple Steam 1-1/4"
18	A0-E011-014	1	Limit Switch
19	A3-SIS1-010	1	Arm for Safety Finger Guard Switch