

FREDERICK CROWTHER AND SON LTD



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Swarf Management and Coolant Filtration Systems

Operation & Maintenance Manual

Frederick Crowther & Son Ltd. Locksley Works, Armytage Road Industrial Estate, Brighouse, West Yorkshire HD6 1QF

> Tel. +44 (0) 1484 400200 Fax. +44 (0) 1484 728088 Email: sales@cromar.co.uk www.cromar.co.uk

Health and Safety

This manual contains instructions intended for the user's daily work with the equipment.

This manual must always be available to the individual or individuals working with the equipment.

It is important to ensure that:

- The manual and other applicable documents are retained for the entire service life of the equipment
- · The manual and other applicable documents are included as part of the equipment
- · This manual is passed on to other users of the equipment
- This manual is updated if any supplements or amendments to the equipment take place
- · This manual describes the methods applied when using the equipment.

Safety code

- Before you start using the equipment and carrying out maintenance or servicing on this equipment, please read through the applicable parts of the instruction
- Assume all electrical equipment is live
- · Assume all hoses and pipelines are pressurised
- When servicing and maintaining the equipment/machine, ensure that the electrical supply is disconnected and the pressure in pipes and hoses is released in a controlled manner
- Servicing and maintenance must be carried out by authorised service and maintenance staff only
- · Use only spare parts approved by Frederick Crowther & Son Ltd
- Make sure that the machine is securely mounted and installed in accordance with instructions before starting it
- · Use the machine only for the intended use
- In the event of abnormal vibration or noise stop the machine and consult the manual
- · Electrical installation must be carried out by an authorised electrician only
- Tanks must be drained of cutting fluids before any lifting operations are carried out.



1 Magnetic Conveyor



1.1 Transportation

General

Swarf conveyors should only be moved by trained personnel, competent in crane operation and slinging.

Do not stand under the moving unit! The illustrations on this page are to be used as an example only. Always use the equipment included for lifting and transport.

1.1.1 With Forklift Truck.

Transport only on the original wooden pallet supplied. Ensure equipment is secured against falling or slipping.



1.1.2 With Crane.

Lift using existing lifting points. Note: The net weight is displayed on the name plate located on the conveyor hood.

1.1.3 Where applicable, conveyors are fitted with castors to assist with final positioning.

1.2 Installation Potential Hazards

- **1.2.1** Discharge internals Should it be necessary to access this area, ensure the conveyor is stopped, electrically isolated by a switch adjacent to the motor, or by disconnecting at the plug, and ensure it cannot be accidentally re-started until the cover is re- positioned. Only qualified personnel should access this electrical equipment.
- **1.2.2** Standing on the conveyors stainless steel surface is not Recommended. For emergency access it is possible to stand on the conveyor, provided the conveyor is stopped, electrically isolated and cannot be accidentally re-started.
- **1.2.3** Do not allow bar ends, components, tooling equipment or hand tools to fall onto the conveyor. These could cause serious damage to the conveyors stainless steel surface and casing. If one of the above does fall onto the conveyor stop the conveyor and machine and remove immediately.

1.2.4 Swarf Discharge.

Do not operate without a collecting container in position to receive swarf. Where end user conditions are such that hot swarf can be discharged from the conveyor, the operator should be made aware of this hazard.

1.2.5 Internal Magnets

Please be aware, this conveyor contains strong magnets which may present a potential health risk to people working in the vicinity. They may interfere with the operation of implanted active body implants, such as heart pacemakers or insulin pumps. They can also interfere with communication and control systems / equipment e.g. mobile phones, laptops and credit cards. It is recommended that a minimum distance of 200mm is maintained.





1.2.6 Controls

Incorporated in Parent Machine Controls.

The conveyor should always be running, during all cutting operations. If automatically stopped by interlocks etc. for safety reasons the conveyor must be restarted when cutting recommences. It is essential that the conveyor motor can be isolated either using a multi-pin plug and socket or an isolator in the motor supply cable.

1.2.7 Control of the Conveyor.

Select 'Forward' 1, to run the conveyor in the 'Operational Mode'.

It is recommended that the conveyor be continuously run throughout a shift period and be allowed to clear all swarf before stopping.



To stop the conveyor, select' 0'

To reverse the direction of the conveyor, use the Hold to Run, Jog Reverse Control 2, to run the conveyor in the opposite direction. This mode should only be used in the event of jamming or for maintenance purposes.

To reset the conveyor after an emergency stop. Unlatch the 'Emergency Stop Button'.

1.2.8 Direction of Operational Mode



1.2.9 Operation – Swarf Applications.

Type of swarf – It is recommended that wherever possible swarf be produced in chip form. Bushy or curly swarf is to be avoided as it is difficult to convey and causes blockages in the conveyor. Chip breakers in the tooling or a 'pecking' motion in the

CNC programme can be employed to prevent this occurring in most applications.

Swarf Handling Capabilities.

Magnetic Conveyor

Material	Ferrous Metal Only			
Conveyor Type	Small	Medium	Large	Bushy
Magnetic	\checkmark	\checkmark	X	X

Small chips up to 5mm. Medium chips up to 15mm. Large chips above 15mm.

- **1.2.10** Conveyors located in coolant are sealed. They have drain slots, generally located in case sides, to allow separation of coolant from swarf and recirculation into the storage tank.
- **1.2.11** Conveyors used as an integral coolant tank have a leak proof casing to contain the coolant. A drain boss is incorporated to facilitate emptying.



- **1.2.12** Where coolant pumps are fitted, these are protected by a mesh filter screens or baskets to minimize ingress of solids into the pump impeller.
- **1.2.13** Any coolant medium is the sole responsibility of the end user and not the conveyor supplier, and all references should be made to the coolant supplier's material safety data sheets.

1.3 Mechanical

The conveyor should be maneuvered into the operating position and fastened to the machine body when appropriate. The screws or castors located at the base of the legs, should be adjusted to support the conveyor, in the operating position.

Where loose swarf chutes are supplied, these should be fitted within the machine to maximize swarf collection onto the conveyor belt.

1.4 Electrical Conveyors Supplied with Controls.

Where controls are fitted, these are normally found mounted on the incline section of the conveyor case and consist of a '3 Position Rotary Selector Switch', incorporating 'Centre off', 'Forward' Run & 'Jog Reverse', functions and also a separate 'Emergency Stop Locking Button' if specified. Note: Rear exit conveyors only are additionally fitted with start warning buzzer and delayed start-up of conveyor.

The motor is also pre-wired to the control box, in accordance with Fig. 2 and a 4-core flying lead (3 phase and earth), of appropriate length, is attached to the control box for connecting to the machine supply. A plug is fitted to suit specific requirements. Additional wiring may be incorporated to comply with specific requirements. IN ALL INSTANCES refer to the wiring diagram (in the appendix) and ensure the conveyor supplied is compatible with the electrical supply required.



Conveyors Supplied Without Controls.

The conveyor drive motor should be wired from the appropriate parent machine controls, using 4 core wire of a size compatible with the current rating. The 3 phase is connected to terminal U1, V1, and W1 in the motor terminal b o x in the alternative configurations as indicated above in Fig. 2 and the earth to the earth terminal. The machine controls should include the following basic functions: Forward 'start' and 'stop' controls. 'Hold' to run 'Reverse' control and complete with contactors and overloads, of compatible current rating.

Interlocking with the machine access door stops the conveyor when the door is opened. All wiring should conform to the latest harmonized European standards or IEE regulations.

1.5 Maintenance

A nameplate incorporating model number, order number, serial number, part number and unit weight is attached to the conveyor casing.

Noise level: Not exceeding 60 Dba at 1 M

- **1.5.1** An inspection every 3 months is recommended. Prompt replacement of worn or damaged parts will extend the life of the conveyor.
- **1.5.2** Before proceeding with any maintenance on the swarf conveyor, it is necessary to isolate the source of electrical supply by either disconnecting at the plug and socket, or by separate isolator. Ensure during maintenance, power cannot be accidentally restored.



ROMA

- **1.5.4** Any loose or adjustable chutes, within the swarf collecting area, should be fitted and set to close gaps, with the adjacent machine walls and then secured in position.
- **1.5.5** Ensure overload in machine electrical cabinet is rated and set to suit full load current of the conveyor motor.
- **1.5.6** Spare parts. Should there be any doubt, contact Frederick Crowther & Son Ltd., quoting serial number and part number, from the nameplate on the conveyor casing.

1.5.7 Gearbox

Each unit is filled with the correct amount and type of oil and should require no further attention.

1.5.8 Shaft bearings

Drive shaft take up bearings and return shaft bearings, are sealed for life and should require no further attention.

1.5.9 Belt

The use of a light machine oil is recommended, and the belt should be regreased by brush application approximately every 3000 hours of running time. Access to the chain can be made by removing the panel located underside at the discharge end.

1.5.10 Chain drives

A light lubricant oil, sufficient to penetrate the chain joints, (SAE 20/50), should be applied with a brush or oil can, every 100 running hours. Aerosol lubricants may also be used.

1.5.11 Conveyor Belt

The conveyor belt is correctly tensioned prior to dispatch. After running for approximately 200 hours, recheck the tension. The belt tension is adjusted via the idler shaft. Ensure each side of the belt is adjusted evenly.

1.5.12 Conveyor Belt Removal - if Belt is Jammed.

In the unlikely event of a conveyor belt being jammed, inspection of the belt may be required. This is done by removing the drive assemble and removal of the stainless-steel surface.

Magnetic Conveyor System

Item No.	Description
1	Magnetic Conveyor
2	Ancillary Equipment
3	Tank

For illustration purpose only.



Magnetic Conveyor



Item No.	Description
1	Hood
2	Conveyor Case
3	Chuting
4	Magnetic Carrier
5	Idler Shaft
6	Drive Assembly
7	Motor Gearbox
8	Tension Shaft
9	Stainless Steel Surface

For illustration purpose only.





1.6 Trouble Shooting

WARNING!

Conveyor to be shut down and electrically isolated prior to any corrective actions.

Electrical maintenance and repairs to be carried out by suitably qualified electrical personnel only.

Problem	Symptoms	Action
1.6.1 Conveyor does not start.	Loose wire. Overload trip. Conveyor jammed. Isolator switch to 'off'.	Check all wiring contacts. Reset overload. Clear congestion. Turn switch to 'on' position.
1.6.2 Conveyor motor starts, belt does not run.	Conveyor jammed.	Clear congestion.
1.6.3 Conveyor intermittently jams or slips.	Belt overload – excessive swarf buildup, or solid foreign body between belt and case.	Clear congested area.
1.6.4 Motor overheats.	Conveyor jammed or overloaded. Overload setting. Motor with a phase out.	Clean congested area. (Reversing the conveyor may clear the jamming). Check setting of overload to suit motor current rating. Check wiring for loose connection.