

SDS

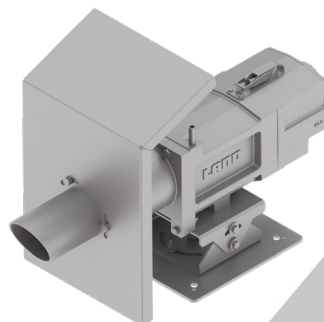
INSTALLATION GUIDE

PUBLICATION N° 813663

LANGUAGE: ENGLISH

ISSUE: 3

DATE: 21 JULY 2021



 Slag Detection System



Health and Safety Information



Read all of the instructions in this booklet - including all the **WARNINGS** and **CAUTIONS** - **before** using this product. If there is any instruction which you do not understand, **DO NOT USE THE PRODUCT**.

Safety Signs



WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or personal injury.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury to the user or users, or result in damage to the product or to property.

NOTE

Indicates a potentially hazardous situation which, if not avoided, could result in damage or loss of data.

Signs and Symbols used on equipment and Documentation



Caution, risk of electric shock.



Caution, attention to possibility of risk of damage to the product, process or surroundings. Refer to instruction manual.



Caution, hot surface.



Protective Conductor Terminal.



Observe precautions for handling electrostatic discharge sensitive devices.

Equipment Operation

Use of this instrument in a manner not specified by AMETEK Land may be hazardous. Read **and understand** the user documentation supplied **before** installing and operating the equipment.

The safety of any system incorporating this equipment is the responsibility of the assembler.

Protective Clothing, Face and Eye Protection

It is possible that this equipment is to be installed on, or near to, machinery or equipment operating at high temperatures and high pressures. Suitable protective clothing, along with face and eye protection must be worn. Refer to the health and safety guidelines for the machinery/equipment before installing this product. If in doubt, contact AMETEK Land.



Wear Protective Gloves



Wear Protective Clothing



Wear Eye Protection



Wear Ear Protection



Wear Safety Boots



Wear Face Protection

Electrical Power Supply

Before working on the electrical connections, all of the electrical power lines to the equipment must be isolated. All the electrical cables and signal cables must be connected exactly as indicated in these operating instructions. If in doubt, contact AMETEK Land.

Contact Us

UK - Dronfield

Land Instruments International

Tel: +44 (0) 1246 417691

China

AMETEK Land China Service

Tel: +86 21 5868 5111 ext 122

USA - Pittsburgh

AMETEK Land, Inc.

Tel: +1 412 826 4444

India

AMETEK Land India Service

Tel: +91 - 80 67823240

Email: land.enquiry@ametek.com

Web: www.ametek-land.com

For further details on all AMETEK Land offices, distributors and representatives, please visit our website.

Storage

The instrument should be stored in its packaging, in a dry sheltered area.

The maximum storage temperature is 10°C (18°F) higher than the maximum operating temperature.

The minimum storage temperature is 10°C (18°F) lower than the minimum operating temperature.

Refer to the Technical Specification for details of the operating temperature limits.

Unpacking

Check all packages for external signs of damage. Check the contents against the packing note.

Lifting Instructions

Where items are too heavy to be lifted manually, use suitably rated lifting equipment. Refer to the Technical Specification for weights. All lifting should be carried out in accordance with local and national regulations.

Return of Damaged Goods

IMPORTANT If any item has been damaged in transit, this should be reported to the carrier and to the supplier immediately. Damage caused in transit is the responsibility of the carrier not the supplier.

DO NOT RETURN a damaged instrument to the sender as the carrier will not then consider a claim. Save the packing with the damaged article for inspection by the carrier.

Return of Goods for Repair

If you need to return goods for repair please contact our Customer Service Department for details of the correct returns procedure.

Any item returned to AMETEK Land should be adequately packaged to prevent damage during transit.

You must include a written report of the problem together with your own name and contact information, address, telephone number, email address etc.

Design and Manufacturing Standards

The Quality Management System of Land Instruments International is approved to BS EN ISO 9001 for the design, manufacture and on-site servicing of combustion, environmental monitoring and non-contact temperature measuring instrumentation.

Registered ISO9001 Management System approvals apply in the USA.

UK Calibration Laboratory: UKAS 0034.

USA Calibration Laboratory: ANAB Accredited ISO/IEC 17025.

National Accreditation Board for Testing and Calibration Laboratories approvals apply in India.

Operation of radio transmitters, telephones or other electrical/electronic devices in close proximity to the equipment while the enclosure doors of the instrument or its peripherals are open, may cause interference and possible failure where the radiated emissions exceed the EMC directive.

The protection provided by this product may be invalidated if alterations or additions are made to the structural, electrical, mechanical, pneumatic, software or firmware components of this system. Such changes may also invalidate the standard terms of warranty.

Copyright

This manual is provided as an aid to owners of AMETEK Land's products and contains information proprietary to AMETEK Land. This manual may not, in whole or part, be copied, or reproduced without the expressed written consent of AMETEK Land.

Contents

1	Introduction	1-1
1.1	About SDS	1-1
2	System Overview	2-0
3	System Components	3-1
3.1	SDS Camera	3-1
3.2	PSU Module	3-3
3.3	Air Blower	3-4
3.4	Process Imaging Workstation	3-6
3.5	IO Module	3-6
4	Camera Location	4-1
5	System Interconnections	5-1
5.1	Cooling Water Connections	5-2
5.2	Purge Air Connections	5-3
5.3	Power & Signal Connections	5-4
5.4	Workstation Network Connections	5-5
6	Software Installation	6-0
7	Maintenance	7-0
8	Spare Parts	8-1

Appendix - Conduit Instructions

1

INTRODUCTION

This Installation Guide gives you information on how to install and set up the AMETEK Land Slag Detection System (SDS)

1.1 About SDS

The AMETEK Land Slag Detection System (SDS) comprises:

- SDS-640 Thermal Imaging Camera
- UL Approved Power Supply Unit
- Air Blower
- Process Imaging Workstation running SDS Software
- IO Module

SDS enables you to:

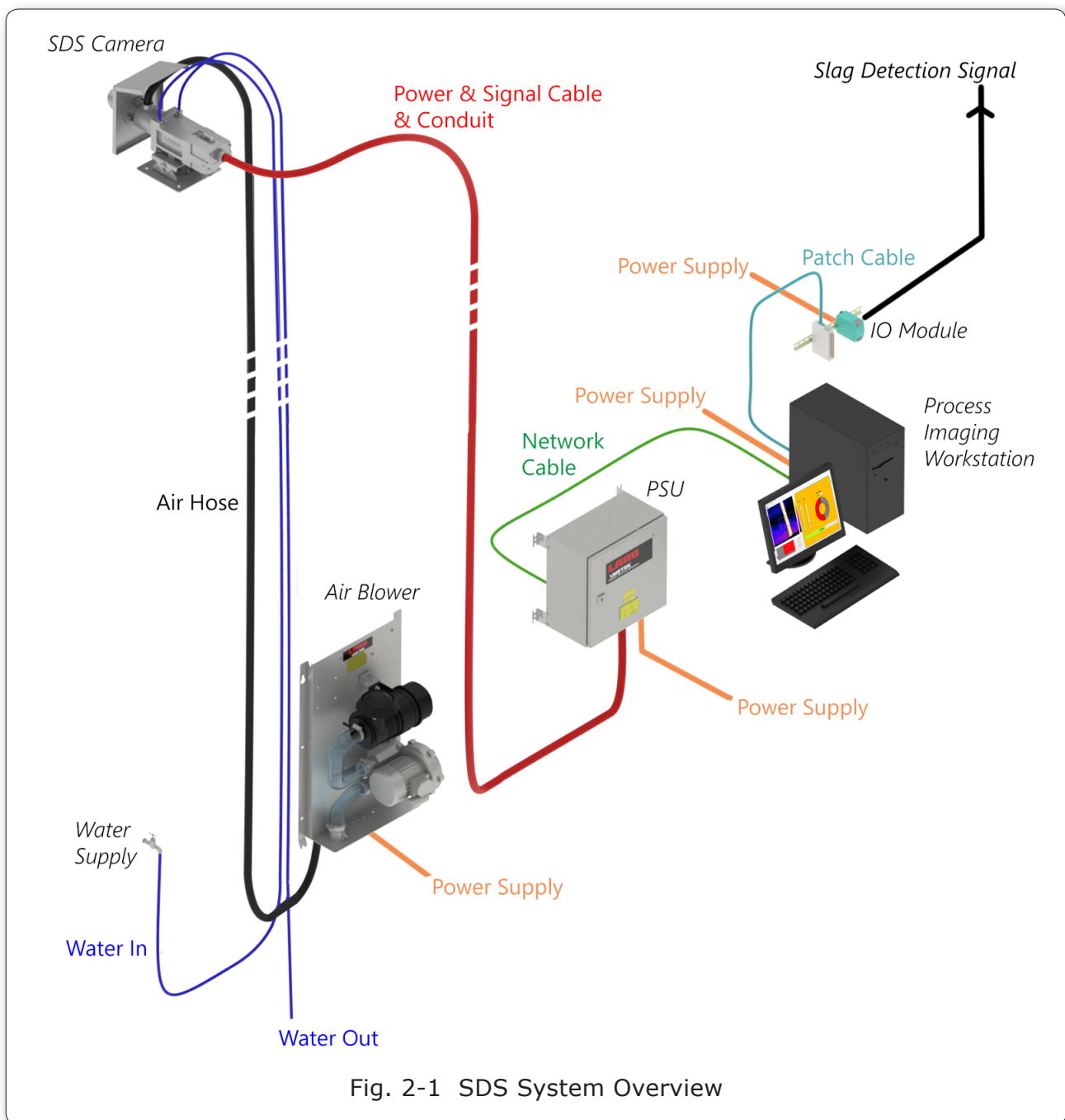
- Monitor the level of slag present during the pouring of molten metal
- Improve production yields
- Lower slag content and improve steel quality
- Reduce maintenance on BOF / EAF vessels
- Reduce energy costs

SDS features include:

- Automatic stream identification and tracking accurately identifies the stream and reduces background interference
- Alarms generated by SDS directly stop the tap before the slag is carried over
- Fully automatic operation
- Accurate detection independent of charge weight
- Reliable alarm independent of the operator
- Improved connectivity

2

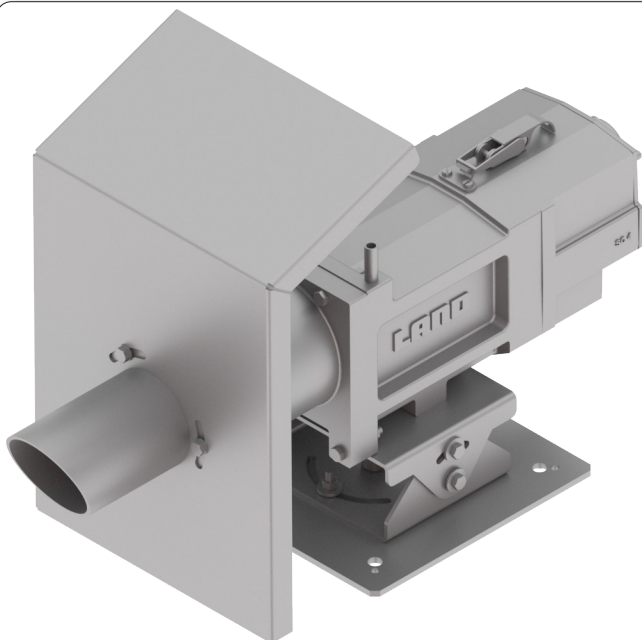
SYSTEM OVERVIEW



3

SYSTEM COMPONENTS

3.1 SDS Camera



Components

- SDS-640 Camera
- SDS-640 Pan & Tilt Assembly
- SDS-640 Protection Plate
- Air Purge, Water Jacket & Back Cap

Fig. 3-1 SDS Camera

Specifications

Measurement Range	800 to 1800 °C / 1472 to 3271 °F
Image Resolution	640 x 480 pixels
Field of View	12° x 9° / 43° x 33°
Motorised Focus Range	4m to infinity / 13ft 3in to infinity
Temperature Resolution	0.5 °C at 800 °C / 0.9 °F at 1472 °F
Accuracy	2% measured value
Protection Rating	IP65
Services	Power & Signal Cable Conduit from PSU Module Purge air from Air Blower Cooling Water
Installation Dimensions	See Fig. 3-2 (overleaf)

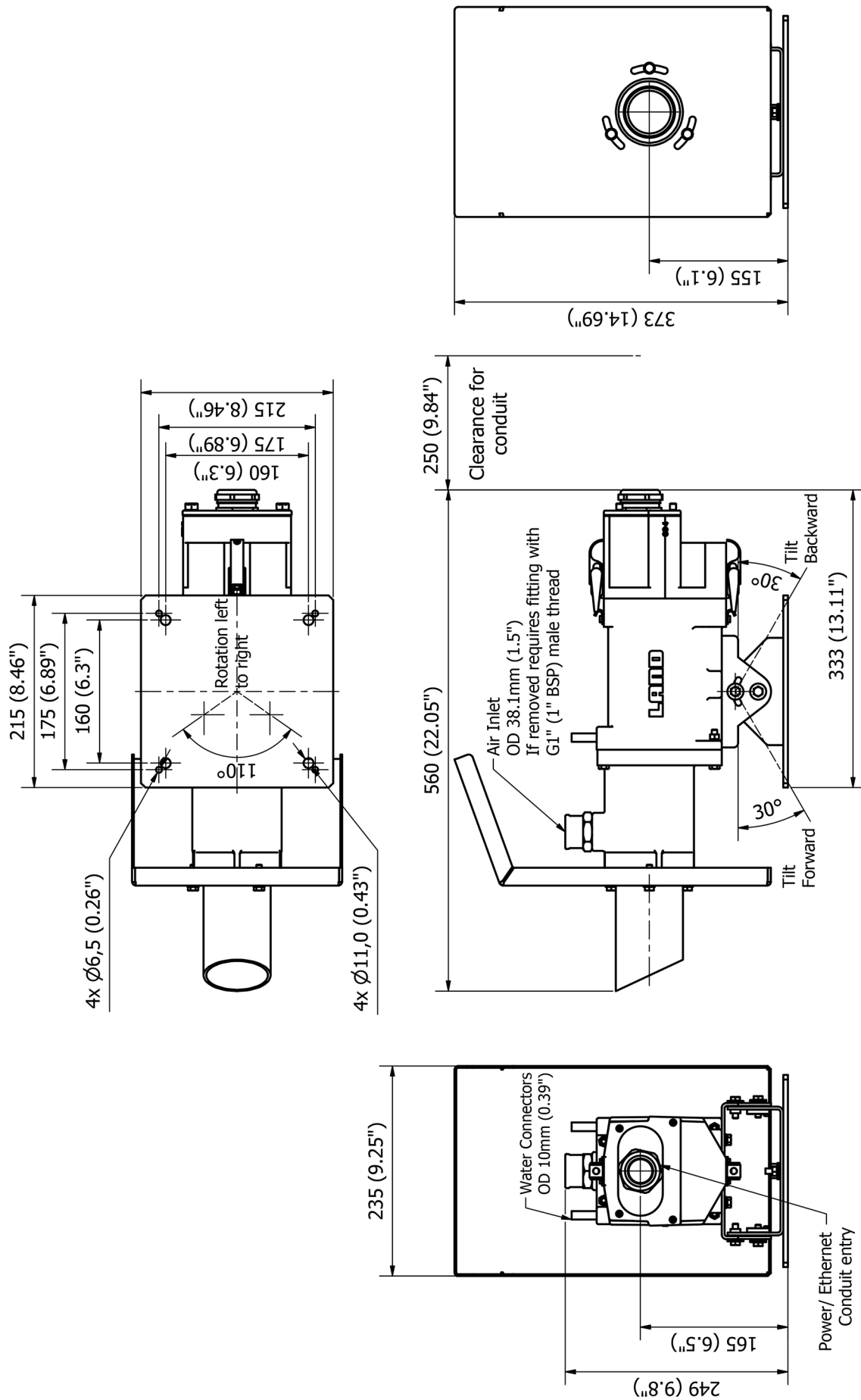
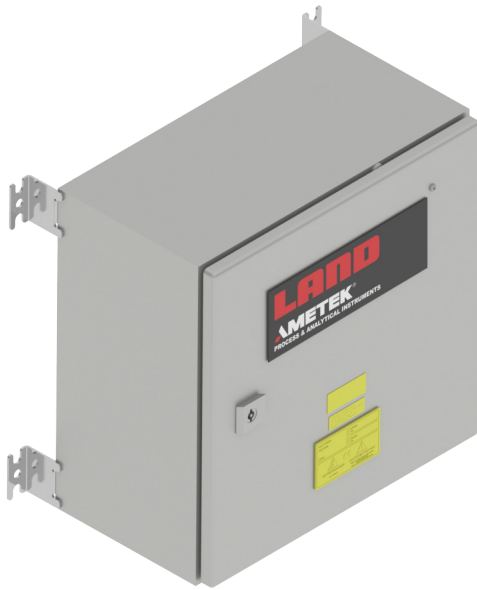


Fig. 3-2 SDS Camera Installation Dimensions

3.2 PSU Module



Features

- Interface between SDS Camera and Image Processing Workstation
- UL Approved

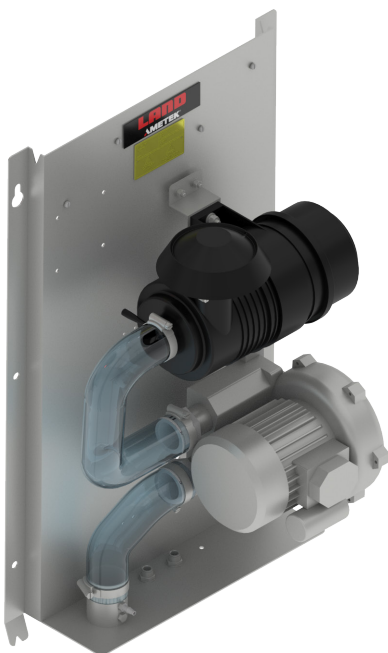
Fig. 3-3 SDS Power Supply Unit (PSU) Module

Specifications

Refer to the SDS PSU (UL Approved) Installation Guide, Publication N° 813482.

Connections	AC Mains Power In Power & Signal Cable Conduit to SDS Camera Ethernet Cable to Process Imaging Workstation
-------------	--

3.3 Air Blower



Features

- Provides constant regulated air supply for SDS Camera purge

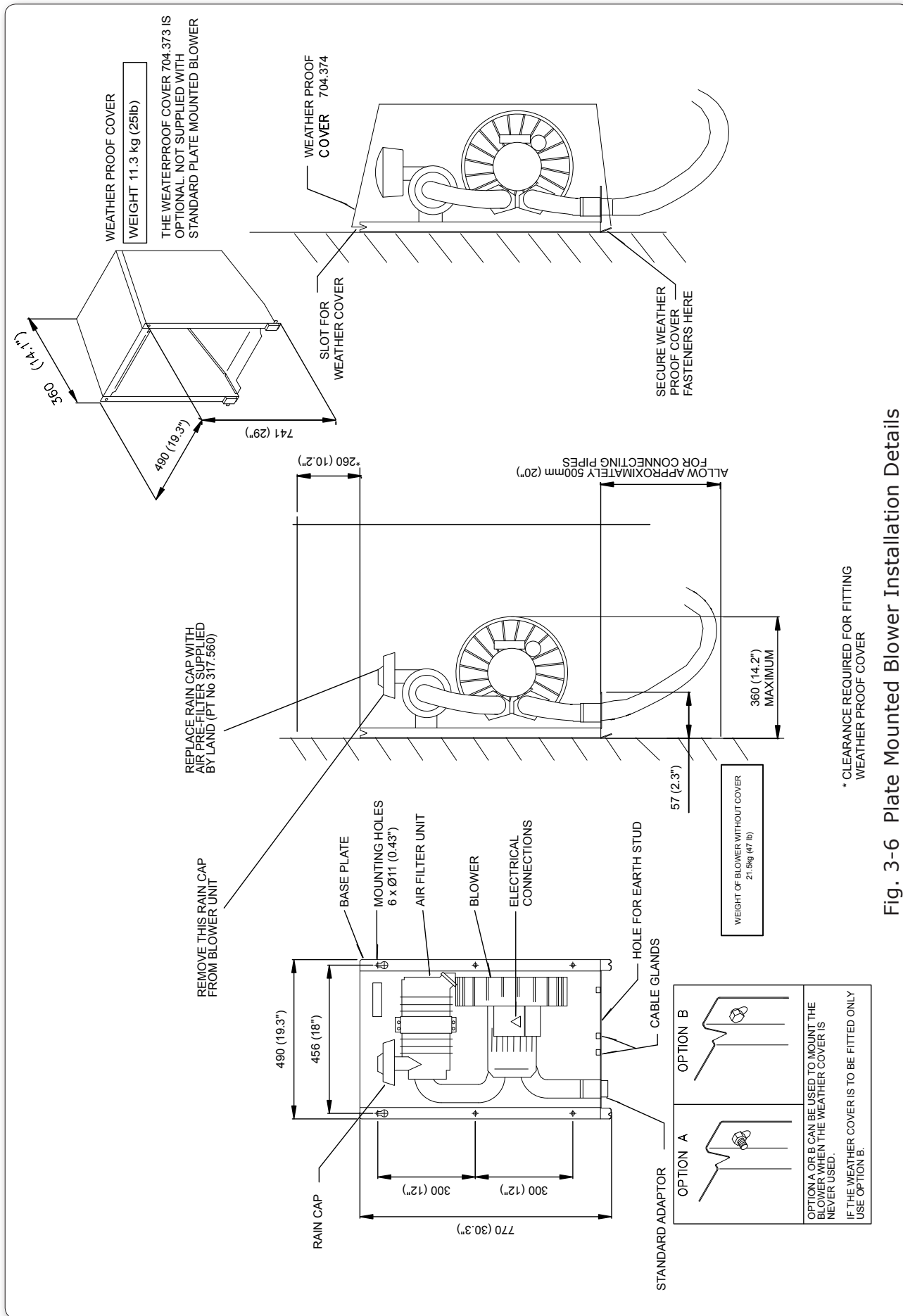
Fig. 3-5 AMETEK Land Plate Mounted Blower

Specifications

Refer to the Plate Mounted Blower Installation Guide, Publication N° 770-073.

Weight	21.5 kg / 47.3lb without cover 32.8 kg / 72.2lb with cover
Connections	AC Mains Power In* 38.1 mm / 1.5in Air Hose to SDS Camera Purge
Maximum Ambient Temperature	50 °C / 122 °F
Input Air Quality	Use only in locations where the incoming air is not corrosive, inflammable or explosive.
Installation Dimensions	See Fig. 3-6

* Choice of supply voltages available



* CLEARANCE REQUIRED FOR FITTING WEATHER PROOF COVER

Fig. 3-6 Plate Mounted Blower Installation Details

3.4 Process Imaging Workstation



Features

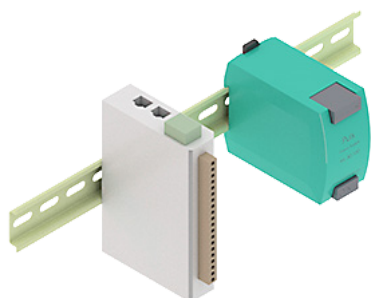
- SDS Server Software

Fig. 3-7 SDS Process Imaging Workstation

Specifications

Connections	AC Mains Power In Ethernet Communications to SDS PSU Module and MOXA I/O
Temperature range	Operating 0 to 35°C (32 to 95°F) Storage -40 to 65°C (-40 to 149°F)
Relative humidity (maximum)	10 to 80% (non-condensing)

3.5 IO Module



Features

- DIN Rail Mounted
- Must be installed inside an enclosure

Fig. 3-8 IO Module & PSU (DIN Rail mounted)

Specifications - IO Module

Mountings	DIN Rail
Connections	AC Mains Power In Ethernet to Process Imaging Workstation
Breakdown Voltage	500 VAC
Contact Current Rating Resistive load	5 A @ 30 VDC, 250 VAC, 110 VAC
Contact Resistance	100 milli-ohms (max.)
Initial Insulation Resistance	1,000 mega-ohms (min.) @ 500VDC
Dimensions	27.8 x 124 x 84 mm / 1.09 x 4.88 x 3.31 in
Weight	200 g / 0.44 lb
Wiring I/O cable	16 to 26 AWG
Operating Temperature Standard Models	-10 to 60 °C (14 to 140 °F)
Storage Temperature (package included)	-40 to 85 °C (-40 to 185 °F) Note: Ambient humidity must be non-condensing and remain between 5 and 95%. The relays may malfunction when operating in high condensation environments below 0 °C / 32 °F.

Specifications - IO Module Power Supply

AC-Input Voltage	AC 100-240V (-15%/+10%)
Input current	<0.6A (@ AC 100V, 30W Pout)
External Input Fuse Recommendation	Minimum B-10A / C-6A
Dimensions (WxHxD)	45 x 75 x 91 mm /
Weight (excluding packing)	230 g / 0.5 lb
Connector Size Range	Flexible cable 0.3-2.5 mm ² (28-12 AWG) Ferrules admissible
Operating Temperature Range	-10 to +70 °C / -14 to +158 °F
Storage & Transport Temperature Range	-25 to +85 °C / -13 to +185 °F

4

CAMERA LOCATION

**WARNING**

Do not attempt to install the SDS Camera when molten metal is being poured in the vicinity.

Camera location

- Refer to Figs. 4-1 and 4-2
- Make sure that the SDS Camera has an unobstructed view of the target
- In the SDS software, make sure that the target is completely within the Field of View (FOV)

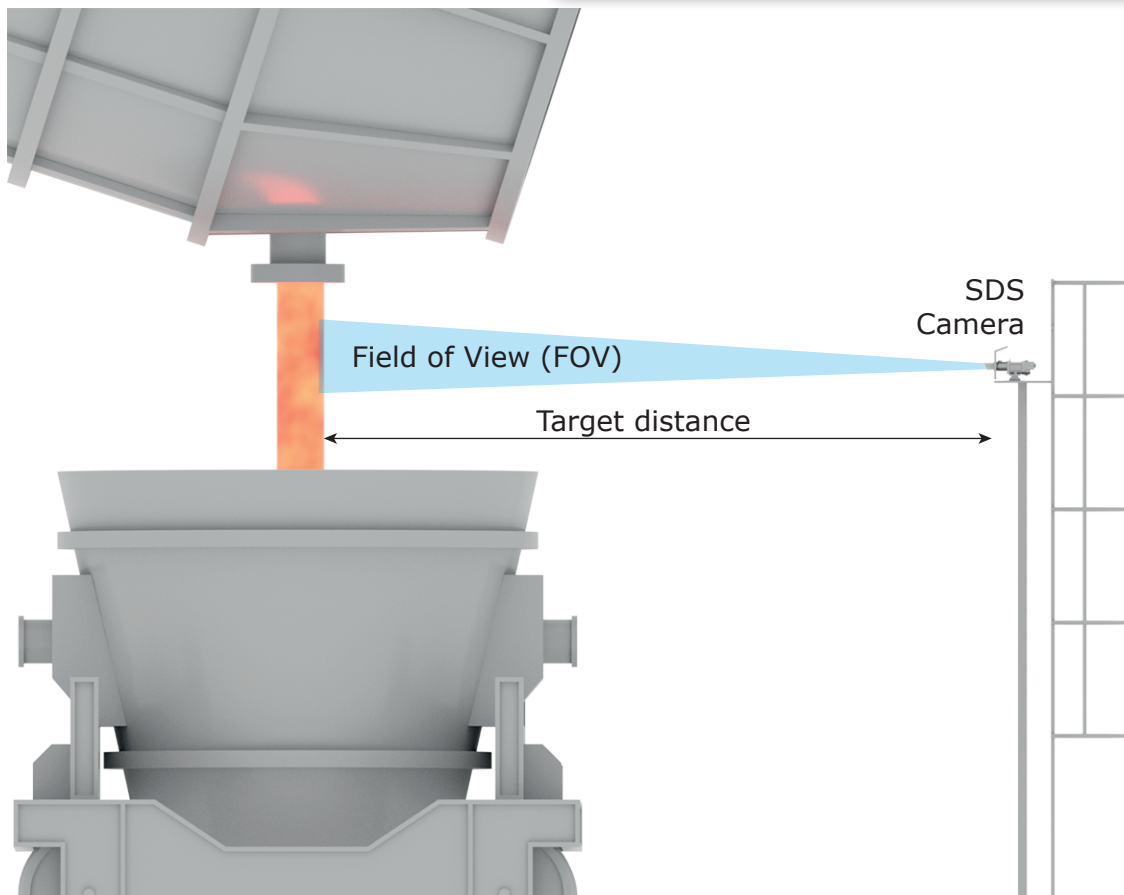
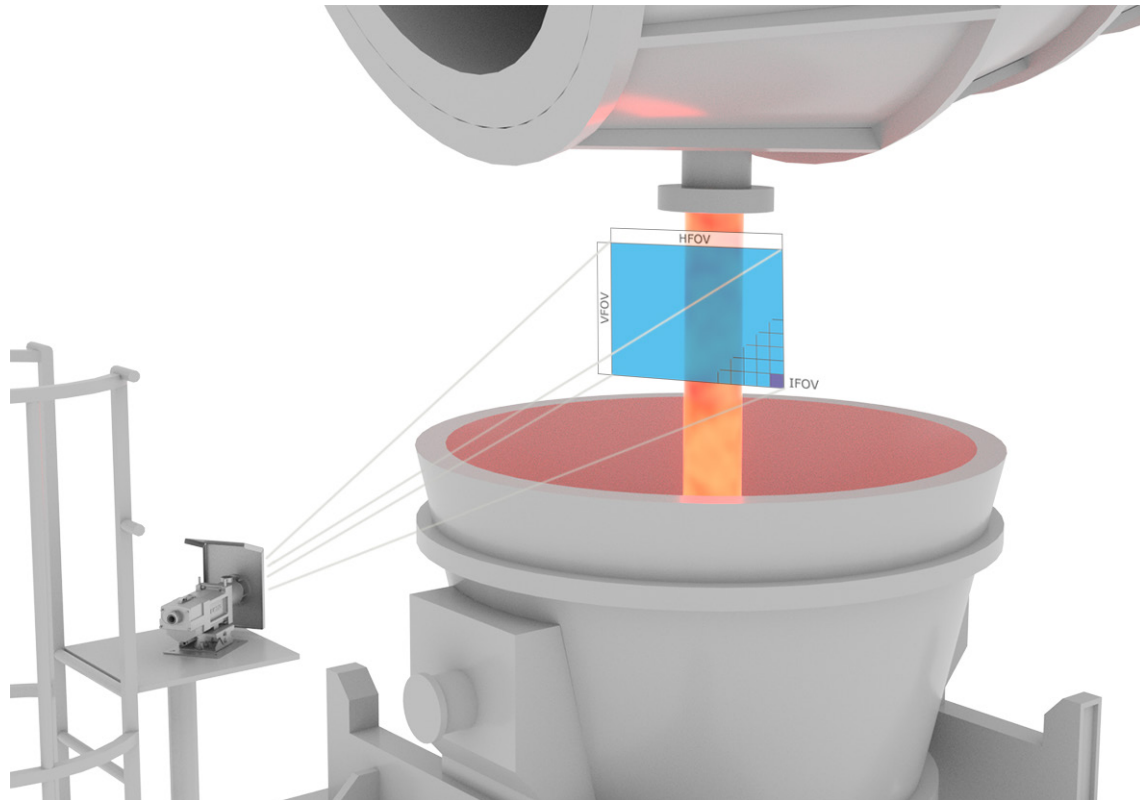


Fig. 4-1 SDS Camera Location and Target Distance



	Distance 4 m		
FOV	Width	Height	IFOV
12° x 9°	0.8m	0.6m	1.3mm
43° x 33°	3.2m	2.4m	4.9mm
	Distance 5 m		
FOV	Width	Height	IFOV
12° x 9°	1.0m	0.7m	1.6mm
43° x 33°	3.9m	2.9m	6.1 mm
	Distance 7.5 m		
FOV	Width	Height	IFOV
12° x 9°	1.5m	1.1m	2.3mm
43° x 33°	5.9m	4.4m	9.2 mm
	Distance 10 m		
FOV	Width	Height	IFOV
12° x 9°	2.1m	1.5m	3.3mm
43° x 33°	7.8m	5.9m	12.2 mm
	Distance 15 m		
FOV	Width	Height	IFOV
12° x 9°	3.1m	2.3m	4.8mm
43° x 33°	11.8m	8.8m	18.4 mm

	Distance 13.1 ft		
FOV	Width	Height	IFOV
12° x 9°	33.1 in	24.8 in	0.05 in
43° x 33°	125.9 in	94.5 in	0.19 in
	Distance 16.4 ft		
FOV	Width	Height	IFOV
12° x 9°	41.3 in	30.7 in	0.06 in
43° x 33°	153.5 in	114.2 in	0.24 in
	Distance 24.6 ft		
FOV	Width	Height	IFOV
12° x 9°	61.8 in	46.5 in	0.09 in
43° x 33°	232.3 in	173.2 in	0.36 in
	Distance 32.8 ft		
FOV	Width	Height	IFOV
12° x 9°	82.7 in	61.8 in	0.13 in
43° x 33°	307.1 in	232.3 in	0.48 in
	Distance 49.2 ft		
FOV	Width	Height	IFOV
12° x 9°	124.0 in	92.9 in	0.19 in
43° x 33°	464.6 in	346.5 in	0.72 in

Fig. 4-2 SDS Camera IFOV for various Target Distances

5

SYSTEM INTERCONNECTIONS

**WARNING**

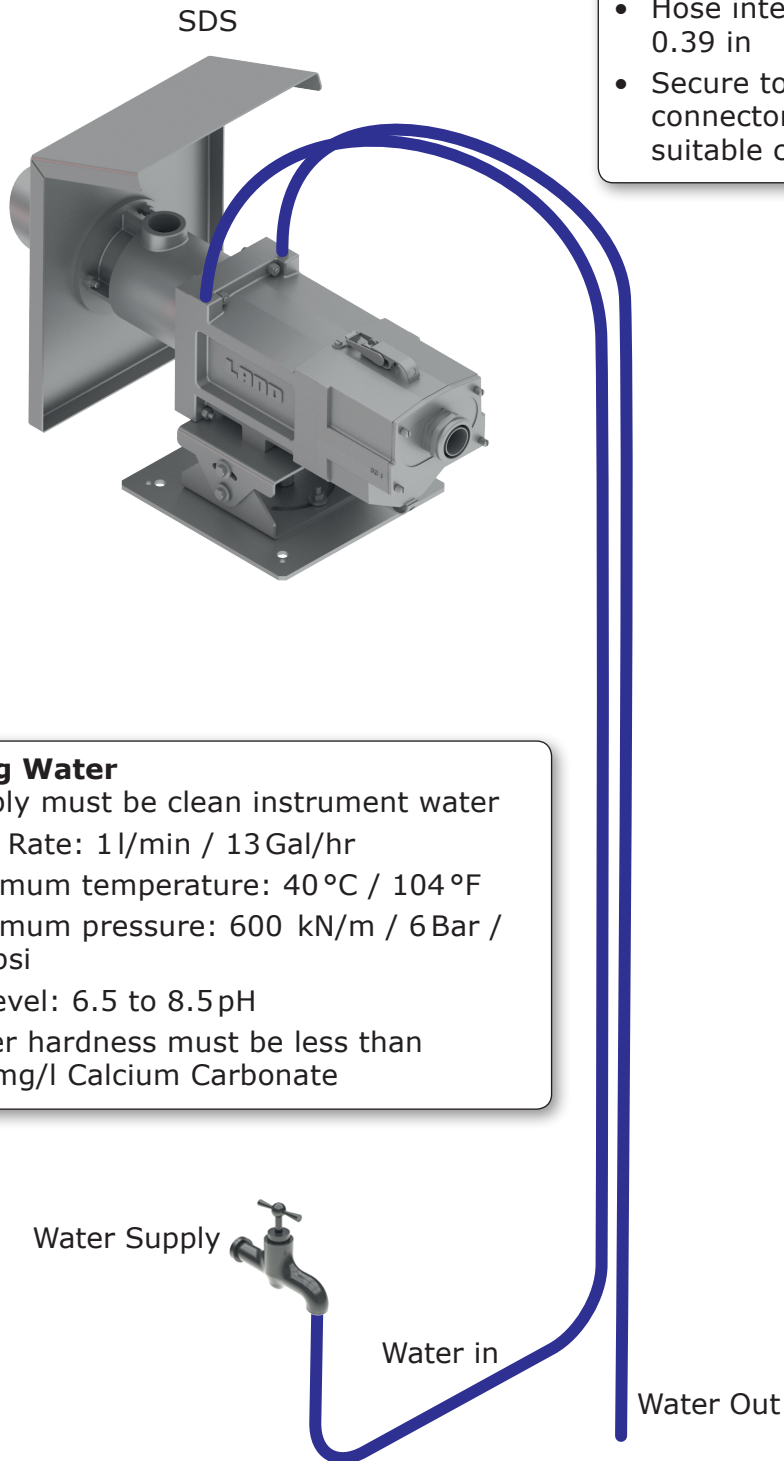
Do not attempt to install the SDS System when molten metal is being poured in the vicinity.

Make sure that the cooling water supply for the SDS protective jacket is installed and operating correctly **before** using the SDS in its chosen measurement location.

Check that the purge air supply for the SDS protective jacket is installed and operating correctly **before** using the SDS in its chosen measurement location.



5.1 Cooling Water Connections



Water Hoses (Customer supplied)

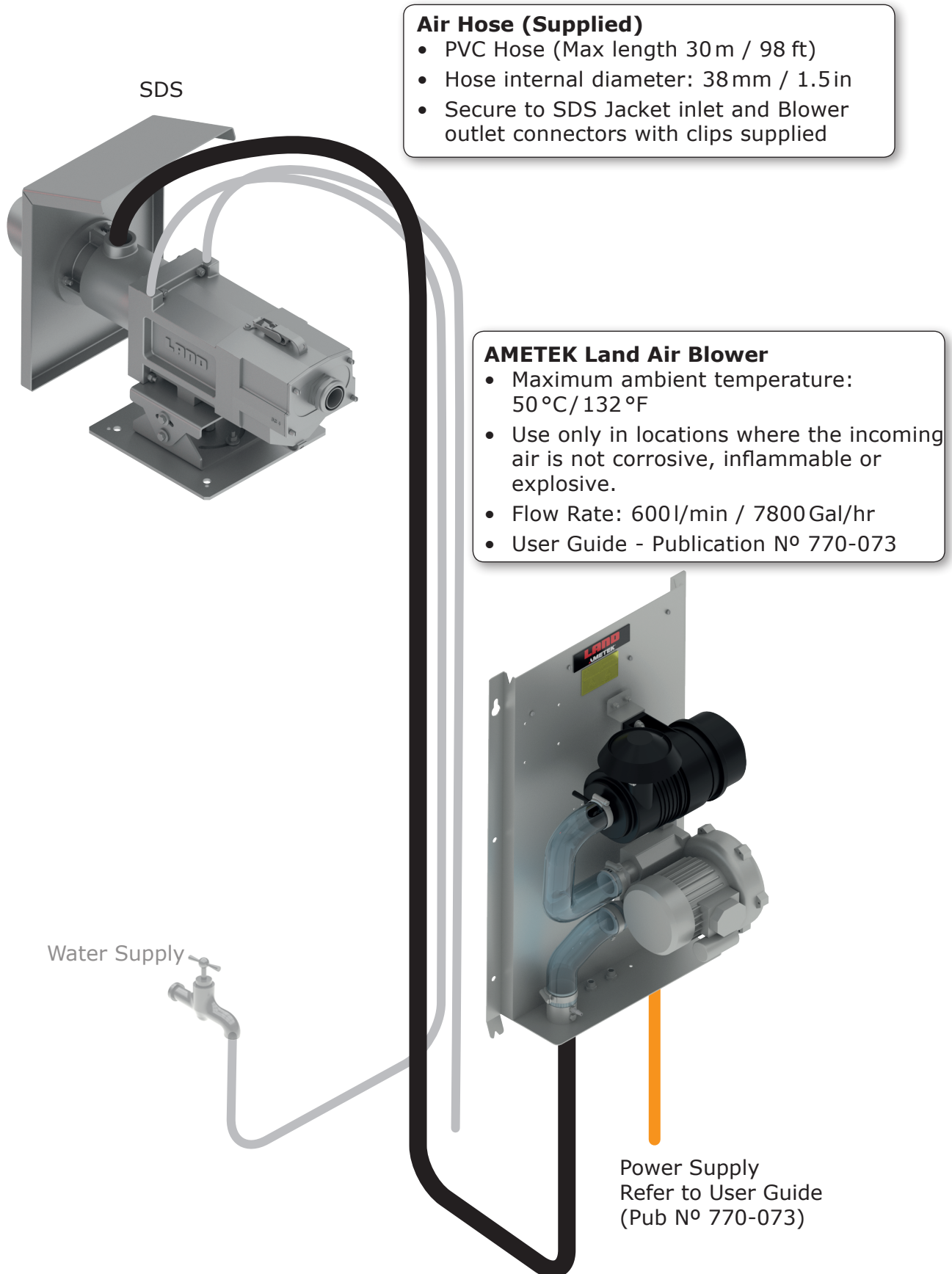
- Always use flexible hose to allow for pan & tilt
- Hose internal diameter: 10 mm / 0.39 in
- Secure to inlet and outlet connectors on SDS jacket with suitable clips

Cooling Water

- Supply must be clean instrument water
- Flow Rate: 1 l/min / 13 Gal/hr
- Maximum temperature: 40 °C / 104 °F
- Maximum pressure: 600 kN/m / 6 Bar / 100 psi
- pH level: 6.5 to 8.5 pH
- Water hardness must be less than 150 mg/l Calcium Carbonate

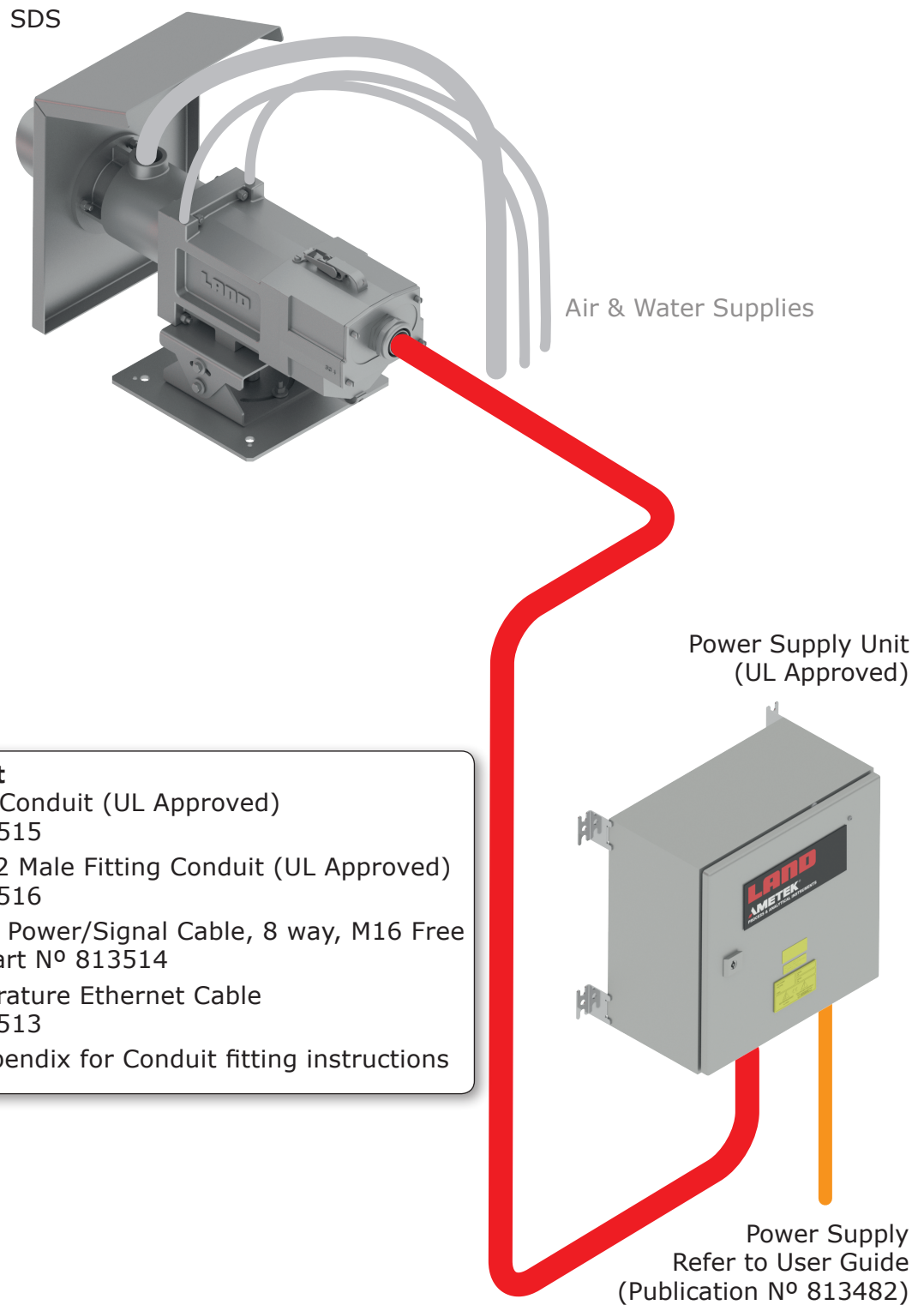
Note: Flow can be reversed

5.2 Purge Air Connections

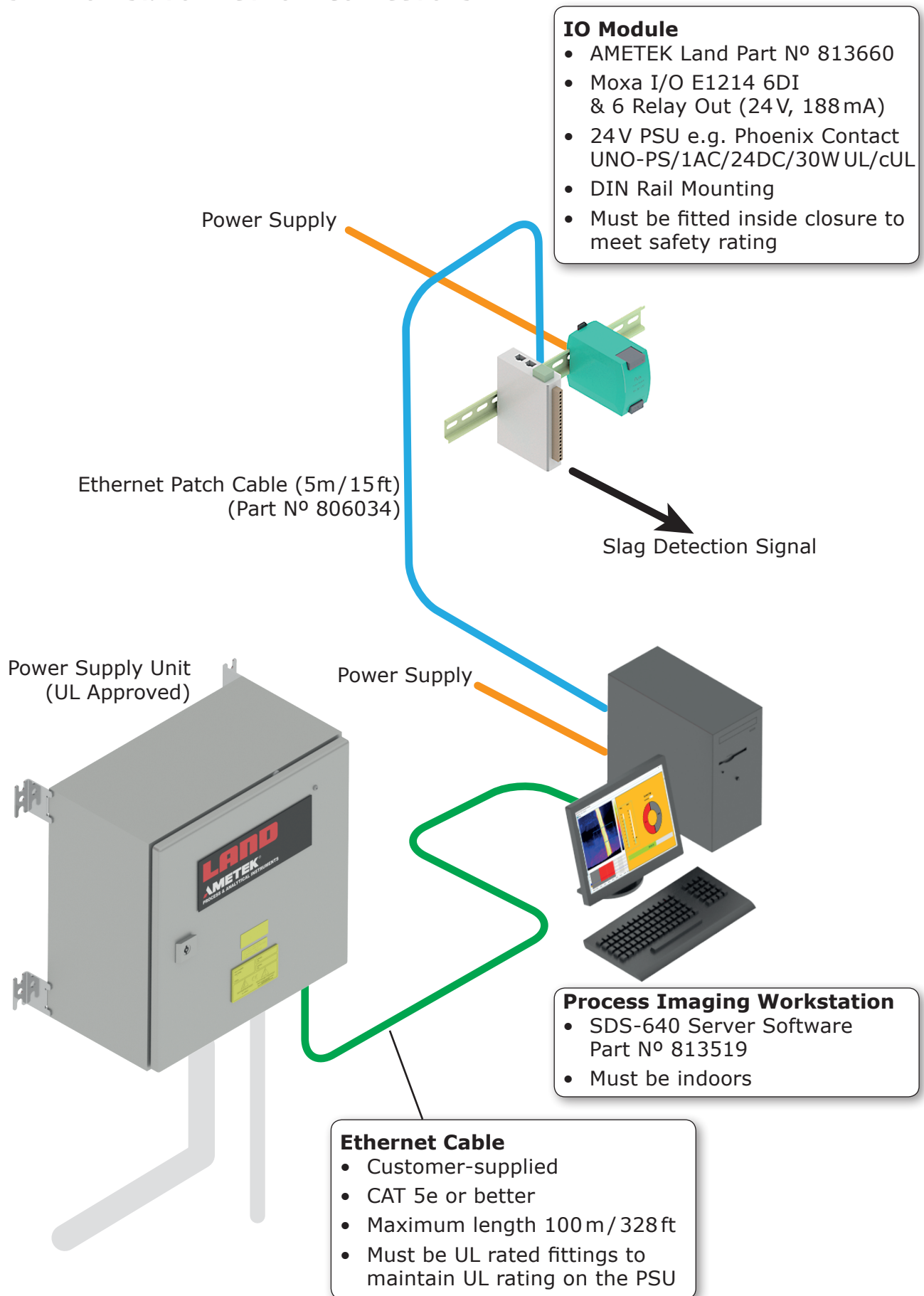




5.3 Power & Signal Connections



5.4 Workstation Network Connections





6

SOFTWARE INSTALLATION

Refer to the IMAGEPro-SDS Software User Guide and Online Help.

7

MAINTENANCE

It is recommended that the following are checked on a regular basis.

- Check for loose wiring or any other damage to cables and/or conduits
- Check that the cooling water supply is within the recommended temperature and flow rate limits
- Check that the purge air supply is within the recommended temperature and flow rate limits.
- Clean external surfaces with a clean, damp cloth.

8

SPARE PARTS

Part Number	Description
813451	SDS 640 System (12° Field of View Camera)
814846	SDS 640 System (43° Field of View Camera)
813216	SDS-640 Camera (12° Field of View)
814833	SDS 640 Camera (43° Field of View)
813472	SDS 640 Pan & Tilt Assembly
813477	SDS 640 Back Cap Assembly
813666	SDS 640 Spare Protection Plate
813478	SDS-640 PSU Module (UL)
813524	SDS-640 Air Purge Assembly
813517	SDS 640 Rugged Enclosure
813661	SDS-640 Cable & Conduit Assembly
813660	SDS-640 System I/O

APPENDIX

CONDUIT INSTRUCTIONS

INSTALLATION INSTRUCTION ANACONDA FITTINGS



For all types SEALTITE conduits (except CNP)

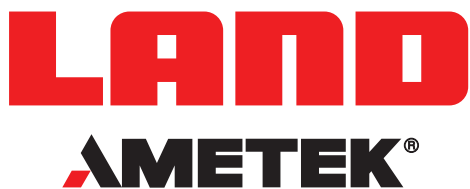
The Anaconda fittings are easy to install.

Place the counter nut (part A) with the thread to the front over the conduit, place the plastic clamping ring (part B) over the conduit, turn the ferrule (part C) in the conduit (hand-tight), place the body (part D) and screw the counter nut hand-tight. Afterwards with a wrench 1 or 2 turns and the fitting is installed IP 67 liquid-tight.



SDS

SLAG DETECTION SYSTEM



AMETEK Land's AMECare Performance Services ensure peak performance and maximum return on investment over the life of your equipment.

We deliver this by:

- Proactively maintaining your equipment to maximize availability.
- Optimizing solutions to meet your unique applications.
- Enhancing user skills by providing access to product and application experts.

AMETEK Land's global service network provides unparalleled after-sales services to ensure you get the best performance and value from your AMETEK Land products. Our dedicated service centre teams and on-site engineers are trained to deliver the highest standard of commissioning, maintenance and after-sales support.

For a full list of international offices, please visit our website www.ametek-land.com

Copyright © 2021 LAND Instruments International.

Continuous product development may make it necessary to change these details without notice.

SDS Slag Detection System Installation Guide, Issue 3, 21 July 2021