DSE–45
Wideband Ultrasonic Sensor
User Manual

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About these operating instructions

These operating instructions describe the installation, commissioning, operation, and maintenance of the DSE-45 and provide important instructions for proper use.

Additionally, where applicable, instructions are included for communications with Fife Controllers/Processors, such as the Fife D-MAX Web Guide Controller. These instructions are to be used in addition to those instructions provided with the controller/processor.

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Periodically there will be updates to this manual. The latest version is available on our website or by calling the number on the back page of this publication.

The operating instructions must be carefully stored and must always be available at or near the customer's system during the service life of the sensor.

The original instructions were written in English.

Target groups

These operating instructions are directed to both the system construction master as well as the operator who uses the sensor in production line.

Read operating instructions

The operating instructions must be read and used by all persons who have the responsibility of installing, commissioning, operating and maintaining the sensor.

Proper use

The DSE-45 is used for non-contact measurement of the lateral offset of a material web being guided in a customer system. The sensor is suitable for

- Web edge guiding,

- Web center guiding, and

- Web width or edge position measurement.

The sensor can be used to control or measure both opaque and transparent materials.

The sensor must only be used in accordance with its intended purpose and in a technically flawless condition.

The sensor must not be changed or opened.

Improper use

Operation outside of the technical specifications is not permitted.

Operation in areas where there is a danger of explosions is prohibited.

The sensor may not be used as a support, handle or step.

Any use other than the designated use is not permitted.

Operation principle

The DSE-45 Ultrasonic Sensor utilizes scanning technology to detect on-web and off-web transition edges of web material that is located within the sensor field of view. This allows new edges to be detected at any time. The scanning orientation is from the closed end of the sensor to the open end of the sensor. The position of the detected edges in relation to either the sensor default proportional band or the user configured proportional band is then applied to the output signals of the sensor. Both analog and digital output signals are provided.

The DSE-45 Ultrasonic Sensor can be used in conjunction with the Fife Controllers/Processors as a guiding system. If the sensor is connected to a D-MAX Operator Interface via an Ethernet connection, multiple menus are available for configuring the sensor. It can also be used as a "stand-alone" for web width monitoring or edge position monitoring.

Definition of terms

Controller/Processor – The electronics processing unit that controls and drives the actuators that are attached to it, in response to position feedback from the sensors.

MAC Address – (Media Access Control). This is the factory assigned hardware address of a DSE-45. MAC Address is also referred to as MAC-ID.

MAXNET – This is the Fife proprietary Ethernet protocol that is used for communications between DSE-45 and D-MAX devices. This is a deterministic protocol. Therefore, the MAXNET network must be isolated from other Ethernet networks that do not follow this protocol.

Polarity – The direction of movement in response to a command or error signal.

Strip/Web – The user material that is being guided.

Virtual Sensor – This is a term adopted to describe the way the DSE-45 handles web edges. A virtual sensor simply defines a range within the sensor field of view which represents the signal scaling to be applied to the edge tracked within the defined range. Each virtual sensor is also polarity-aware so that it only tracks the edge with the configured polarity. Virtual sensor sizes can be the entire field of view or can be as small as 10.2 mm [0.4 in], and since they are just mathematical ranges, they can overlap in any conceivable manner.

Important safety information

To ensure safe and problem-free operation of the DSE-45 it must be
- properly shipped and stored,
- properly mounted and placed in operation,
- properly used and carefully maintained.

Proper operation and careful maintenance will ensure a long service life for the sensor.

Please note the following:
- The content of these operating instructions
- Any safety instructions that are printed on the unit
- The requirements of the machine manufacturer
- Applicable national, state and local requirements for accident prevention and environmental protection

Information about safety instructions

The safety instructions and symbols described in this section are used in these Operating instructions. They are used to avoid possible dangers for users and to prevent material damage.

SIGNAL WORD
Source of danger and its results.
Avoiding dangers

Signal words

The signal word DANGER indicates an immediate danger of serious injury or death.

The signal word WARNING indicates a possible danger which could lead to serious injury or death.

The signal word CAUTION refers to a possible danger which could lead to slight to moderate injury.

The signal word ATTENTION refers to a possible danger which could lead to material damage.

Symbols used

Reference to general hazards that may result in bodily injuries

Refers to danger of injury caused by crushing

Refers to danger of injury caused by cutting

Refers to general hazards that will result in damage to the device or system

Qualified electrician
The electrical components may only be connected and disconnected by a qualified electrician!

Read operating instructions
Follow these operating instructions for proper and safe use. Keep for future use.

Other markings

Reference to important information

Personnel requirements

The tasks listed in these operating instructions may only be carried out by appropriately qualified personnel commissioned by the operator. The responsibilities of the personnel for the work on the system must be clearly defined by the operator.

Transport, assembly, maintenance, troubleshooting, disassembly
Specialized staff
- Mechatronics engineer, industrial mechanic, etc.

Electrical connection or disconnection
Specialized staff
- Only by a qualified electrician

Control during operation
Specialized staff
- Machine and system operators, etc.
- Personnel or trainees trained and supervised by the system operator

Repair
Specialized staff
- Service technician of Fife-Tidland GmbH

Qualified electrician

A qualified electrician is a person whose specialist training, knowledge and experience, as well as knowledge of the relevant standards, enable him to assess and perform the work assigned to him and to recognize and avoid possible hazards.

The electrician is specially trained for the field in which he or she works and is familiar with the relevant standards and regulations.

Preventing hazards

- No changes may be made to the sensor.

- Electrical lines must not be subjected to any mechanical loads.

- The parameters specified in *Section 11.1, Specifications* must be observed.

- Only accessories and replacement parts that have been approved by Fife Tidland may be used.

- The sensor may not be used as a support, handle or step. There is a danger that the sensor will become damaged (breaking off/snapping), resulting in personal injury.

The DSE-45 can be remotely controlled via a network connection. As with any network-controlled device, when remote control of the device is implemented, there is the possibility of movement of the guiding structure when remote commands are issued. Therefore, any time personnel are near the guiding structure, it is recommended that standard safeguards be taken to prevent injury. During servicing of the equipment, to prevent injury to personnel, it is recommended that standard Lockout/Tagout procedures be used.

Transport and storage

- The sensor and/or the unit on which the sensor is mounted must be secured against slipping during transport
- The sensor must be stored in a cool, clean, and dry place; see *Ambient Conditions, page 11.1*
- The sensor must not be stored in the vicinity of powerful magnetic fields. The electronic components of the sensor may be damaged.

Mounting

The DSE-45 Ultrasonic Sensor can be mounted to a square bar using the optional mounting brackets, or by using the incorporated mounting holes near the far corners of the sensor housing. For complete details, refer to the installation drawings and instruction sheets included with your shipment.

WARNING

- If a sensor is damaged, it must not be installed or placed in operation.
- All assembly tasks on the sensor must only be performed when there is no electrical power in the system.
- Assembly tasks and mechanical settings must only be performed when the machine has been stopped and secured from being turned on again.

Mounting location

- Protection Class: IP65

- Operating temperature: 5°C ... 60°C [40°F ... 140°F]

- Relative humidity: maximum 85%

- Operating altitude above sea level:

  maximum 5000 meters [16,000 feet]

- Protected from vibrations

- Do not place close to strong magnetic fields; the electronic components may be damaged.

- Do not place close to strong electrostatic fields; the electronic components may be damaged.

- Do not mount in places where there is a risk of explosions.

Product dimensions

1 – Sensor gap (typical for all sensors)

2 – M5 x 20 mm SHCS with lock washer

3 – The minimum bend radius of the optional Ethernet cable is 90 mm [3.54 in].
   The minimum bend for output and auxiliary cables is less.

Figure 1. Product dimensions

Sensor model	A Bandwidth	B Bandwidth center	C	D	E
DSE–45–7	66.2 [2.606]	59.75 [2.351]	193.2 [7.606]	n/a	175.2 [6.898]
DSE–45–11	107.0 [4.213]	80.0 [3.149]	234.0 [9.213]	n/a	216 [8.504]
DSE–45–18	178.4 [7.024]	115.69 [4.555]	305.0 [12.024]	105.0 [4.134]	287.4 [11.315]
DSE–45–31	311.0 [12.244]	181.98 [7.164]	438.0 [17.244]	210.1 [8.272]	420.0 [16.535]
DSE–45–52	515.0 [20.276]	283.96 [11.179]	642.0 [25.276]	420.0 [16.353]	624.0 [24.567]

Mounting the sensor

ⓘ Remove the plastic dust covers from the connectors that will be in use for your application.

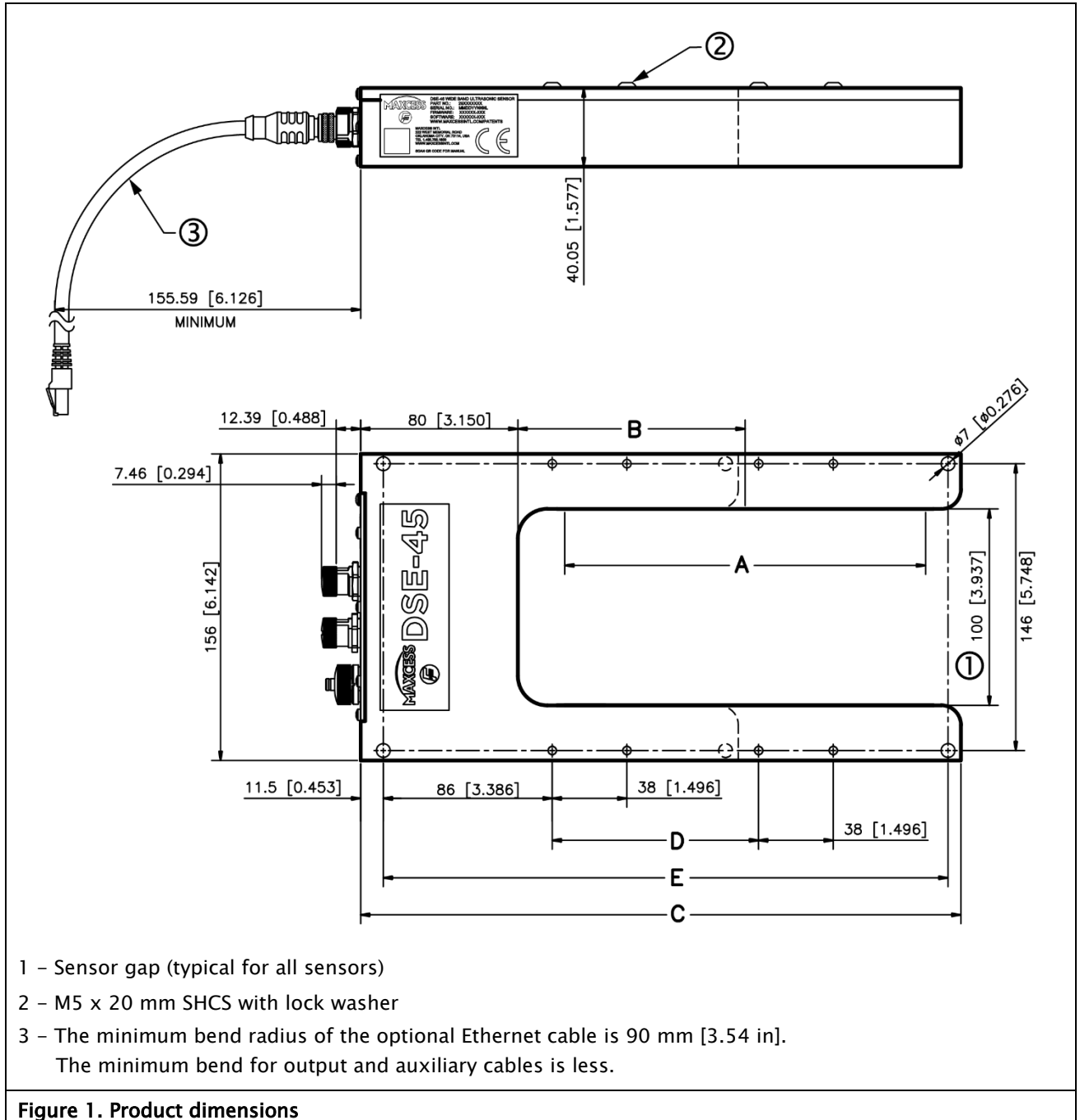For complete details, refer to the installation drawings and instruction sheets included with your shipment.

4 – Center line of sensor should be offset 15 degrees or more of perpendicular to the web pass line.

5 – Web pass line

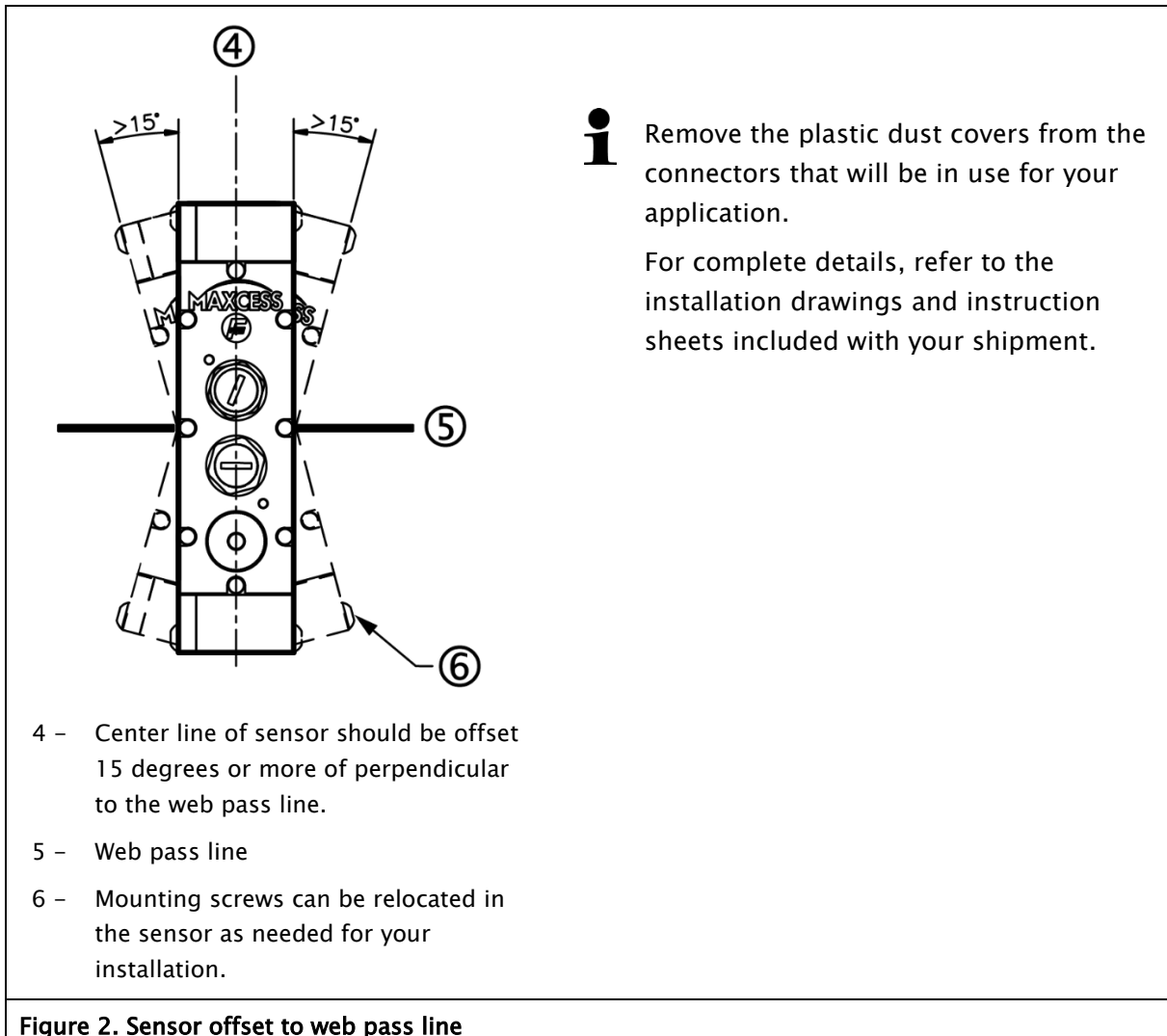6 – Mounting screws can be relocated in the sensor as needed for your installation.

Figure 2. Sensor offset to web pass line

DSE-45 connections

Disconnect power from the DSE-45 before connecting or disconnecting any cables.

All cable connectors must be tightened sufficiently to provide the required connection for the cable shielding.

X1 –   **ETHERNET**

X2 –   **AUXILIARY**
              Auxiliary power (+10.5 to +51 VDC)
              Analog output (web width)

X3 –   **OUTPUT**
            –   Connection to controller (default)
            –   Power input (+10.5 to +28 VDC)
            –   Analog outputs (edge1, edge2, web width)
            –   RS-485
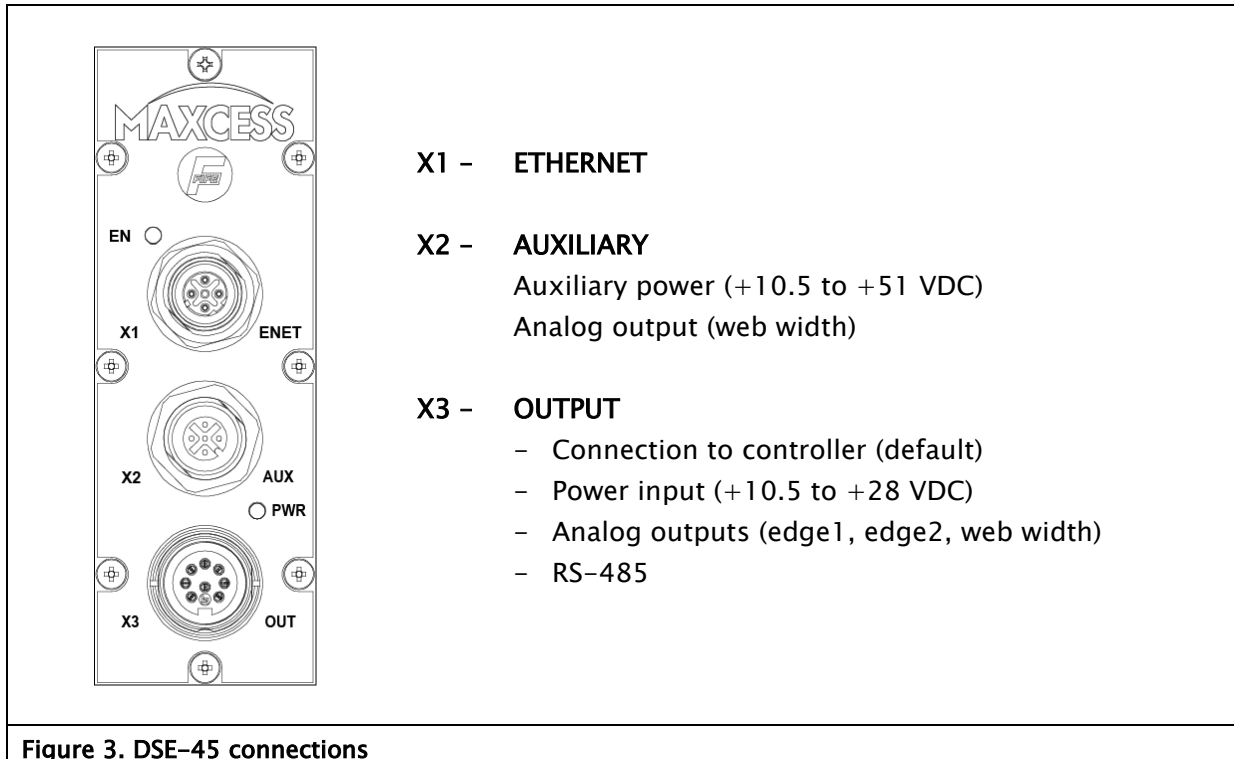
Figure 3. DSE-45 connections

Power connection

Power to the DSE-45 should be supplied to either the X2 or X3 Connector, but not to both connectors.

–   When used as a 'stand-alone' sensor, power should be applied to the X2 Connector. Follow the voltage guidelines in Figure 3.

–   When used as part of a Fife system, the Controller/ Processor generally supplies power to the X3 connector. If alternate power is to be supplied, refer to the system drawings for information on power supply requirements. Verify that the supply is within the above listed limits.

Network connection

Optional network communication
settings

- - The IP address of each Ethernet device in a network must be unique to each device in the network. All DSE-45 sensors are shipped from the factory with the same IP address (10.0.0.150). If it is necessary to change the IP address of the DSE-45, see *Web Access Network; page 6.1.*

- - MAXNET is a Fife proprietary protocol used to communicate between the DSE-45 and other network devices, such as the Fife D-MAX Controller and D-MAX Operator Interface.

- - The MAXNET address of each Ethernet device in a network must be unique (Address 1-31). The address must not be 0 (zero). If using the optional Ethernet connection on the DSE-45, you will need to set the MAXNET address of the sensor. see *Web Access Network; page 6.1.*

DSE-45 outputs

The DSE-45 Ultrasonic Sensor provides analog outputs for backward compatibility and an Ethernet digital interface for advanced functions.

The DSE-45 Ultrasonic Sensor can be used in conjunction with the Fife Controllers/Processors as a guiding system. If the sensor is connected to a D-MAX Operator Interface via an Ethernet connection, multiple menus are available for configuring the sensor.

It can also be used as a "stand-alone" for web width monitoring or edge position monitoring.

The following sections describe the default and optional settings for available sensor parameters.

Before changing any of the sensor parameters, verify that the controller that is using this sensor as a signal source is in either Manual Mode or Servo Center Mode. Otherwise, there is the possibility of movement of the guiding structure.

Analog outputs

There are four configurable analog outputs, controlled by three configurable signal sources. The analog outputs can be independently configured to produce any combination of the following signal ranges. The analog output mapping can be configured for each of the sensor jobs. An Ethernet connection to the sensor is required for configuration changes.

> 0 to 10 mA (default)
> 0 to 20 mA
> 4 to 20 mA
> OFF

Two of the four analog outputs, by default, provide edge position (the first on-web edge and the first off-web edge detected in the scan direction).

The other two outputs, by default, provide web width measurement and are common to each other in function, but are located on two separate connectors for accessibility in various applications.

The function assigned to the analog outputs is configurable. Any signal produced by the DSE-45 can be mapped to the analog outputs up to and including duplicating the same signal on all outputs, if desired. An Ethernet connection to the sensor is required for configuration changes.

The default mode maps the analog channels as follows:

Analog Channel 0 (Analog Output 1) = VS_1 (Virtual Sensor 1)
Analog Channel 1 (Analog Output 2) = VS_2 (Virtual Sensor 2)
Analog Channel 2 (Analog Outputs 3 and 4) = WW_1 (web width)

Digital outputs

The digital outputs are transmitted via a proprietary Fife MAXNET Serial Protocol over Ethernet, which requires an optional Ethernet cable connected to a network device.

For more information about the available signals; see *DSE-45 Web Page, page 6.6.*

Sensor jobs

The DSE-45 supports storage for up to eight different jobs. A job contains the sensor operation mode (single or multiple proportional bands), the proportional band size, and all learned virtual sensor parameters.

The DSE-45 default has only a single job enabled and is configured as a single proportional band.

Recalling a stored job immediately activates the position and proportional bands for all virtual sensors. *Select job; page 8.5*.

In order to use more than one job, additional configured jobs must first be enabled; *Control Options, page 8.7.*

Operation modes

The DSE-45 can be operated in either of two modes.

Single proportional band mode

ℹ️ To monitor the position or width of more than one web, use Multiple Proportional Band mode; *page 8.3*

The default Single Proportional Band operation mode of the DSE-45 used for guiding and web width monitoring of a single web. This mode uses two overlapping virtual sensors that span the entire field of view of the sensor.

Figure 4 illustrates the general nature of this mode of operation, when both edges of a web are present in the sensor field of view.

The Virtual Sensor 1 (VS1) signal represents the <u>first</u> on-web transition found (the web edge closest to the closed end of the sensor).

Virtual Sensor 2 (VS2) signal represents the <u>first</u> off-web transition (the web edge toward the open end of the sensor). This is generally used to guide to the center of the web by monitoring the position of both edges of the web.

If additional web edges are present in the sensor field of view, they are detected by the sensor, but they are not normally used. Therefore, Virtual Sensors VS3 thru VS16 are not normally used in this mode.

This mode can also be used to detect only the first on-web transition found, as would be the case when a web extends beyond the open end of the sensor.
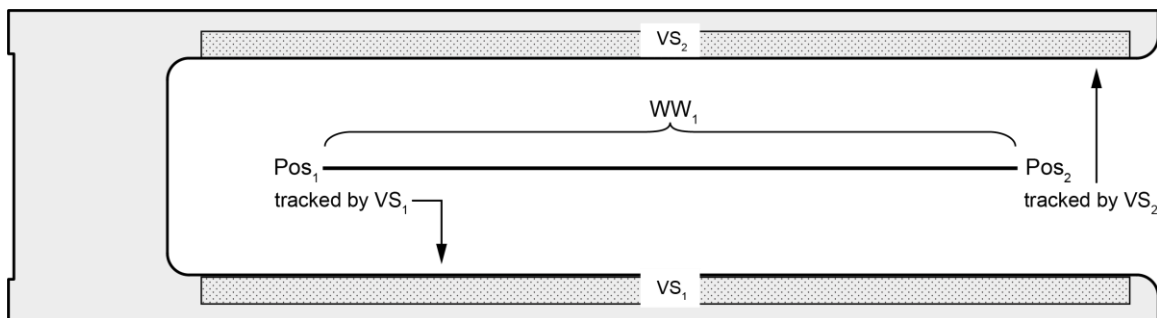
See *Job Settings; page 8.2.*

Figure 4. Single proportional band

Multiple proportional band mode

> ℹ️ To monitor the position or width of a single web, use Single Proportional Band mode; *page 8.2*

Multiple Proportional Band operation mode of the DSE-45 Ultrasonic Sensor is used for guiding and web width monitoring of multiple webs. This mode can provide up to sixteen virtual sensors, which can be located anywhere in the sensor field of view. Figure 5 illustrates the general nature of this mode of operation.

Configuration of this mode requires an Ethernet connection to a network device, such as a PC or a Fife D-MAX Operator Interface.

This mode enables additional menu-controlled features, including **Proportional Band Size**, **Learn Edges**, and **Virtual Sensor Linking**; *page 8.4.*

Jogging or shifting of the virtual sensors is also available in this operation mode. See *Jog Virtual Sensors; page 9.1.*

The sensor can track up to 8 webs (16 edges). All signals are available via Maxnet, or any three signals can be mapped to the DSE-45 analog outputs.

See *Job Settings; page 8.3.*

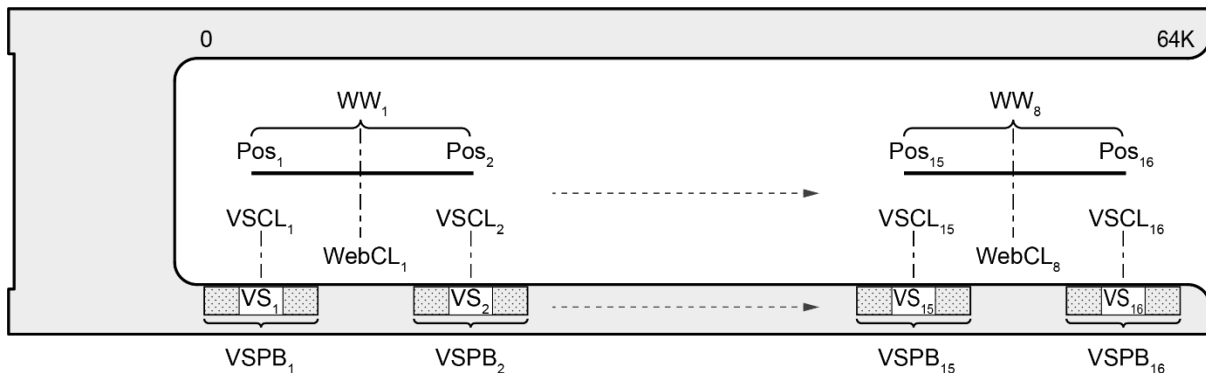
Figure 5. Multiple proportional band

Features available in Multiple Proportional Band mode

Learn Edges provides a method to automatically build virtual sensor(s) based on the position of webs that are placed in the sensor field of view. The number of virtual sensors built depends on the number of web edges detected.

Proportional Band Size establishes the width of the virtual sensors. This is a global setting that applies to all virtual sensors.

Sensor Linking provides a means to link two or more virtual sensors together. If one of the virtual sensors is shifted, all of the virtual sensors that are linked to that virtual sensor will follow it as it shifts.

See *Job Settings; page 8.4* .

Modbus/TCP interface

The DSE-45 provides Modbus/TCP slave capability. An optional Ethernet cable is required for communication between the sensor and a network device.

The default settings
- permit the collection of lateral position information for up to eight webs (sixteen edges), and
- support remote control commands for virtual sensor operations such as learning edge positions and shifting virtual sensors individually or in groups.

Default signals

$PosEdge_n$ = Edge position relative to the complete sensor field of view. (0-65535).

$VSCenter_n$ = Virtual sensor center position relative to complete sensor field of view. (0-65535).

$VSOutput_n$ = Virtual sensor output based on edge position within the virtual sensor field of view. (± 32767).
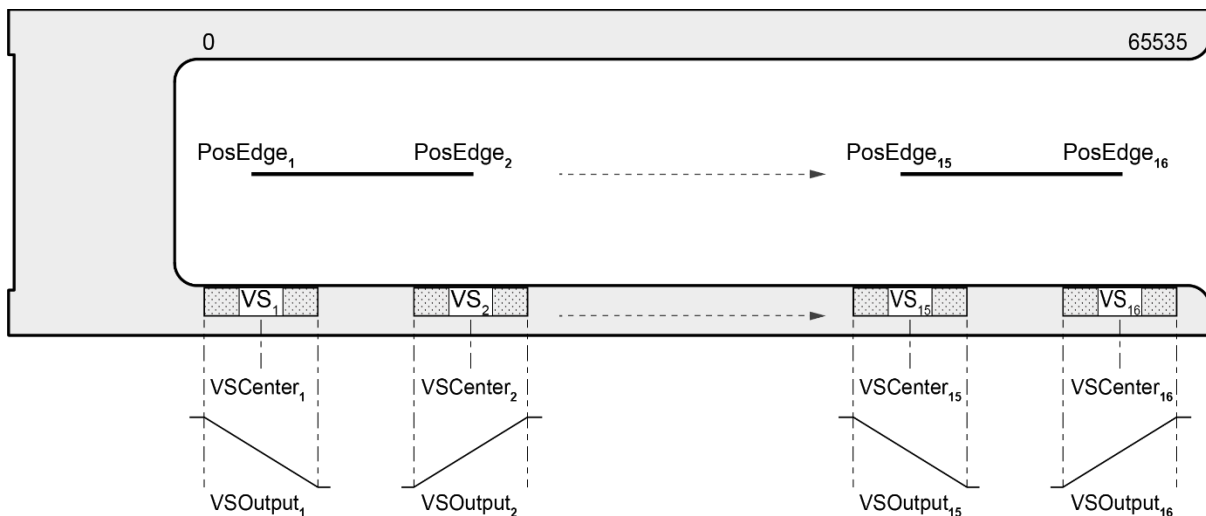

Figure 6. Modbus/TCP default signals

Default data

The default data available from DSE-45 Modbus slave is as follows.

DSE-45 to Customer (57 words)		
Register	Parameter	Description
0	Reserved	Reserved.
1	RemReqCmd	Remote control command. (See remote control)
2	RemReqStatus	Remote control status. (See remote control)
3	RemReqParam1	Remote control parameter. (See remote control)
4	Transducer Count	Number of transducers in sensor.
5	Job Number	Current active job number (1 to 8)
6	Edge Count	Number of edges present.
7	Web Count	Number of webs present.
8	PB Size	Virtual sensor proportional band size (0 to 65535).
9	VSCenter1	Position of virtual sensor centers (0 to 65534) Transducer count can be used to provide conversion to desired unit of measurement. Multiply transducer count by 5.1 mm to determine complete sensor field of view.
10	VSCenter2	
11	VSCenter3	
12	VSCenter4	
13	VSCenter5	
14	VSCenter6	
15	VSCenter7	
16	VSCenter8	
17	VSCenter9	
18	VSCenter10	
19	VSCenter11	
20	VSCenter12	
21	VSCenter13	
22	VSCenter14	
23	VSCenter15	
24	VSCenter16	
25	VSOutput1	Virtual sensor outputs (±32767)
26	VSOutput2	
27	VSOutput3	
28	VSOutput4	
29	VSOutput5	
30	VSOutput6	
31	VSOutput7	
32	VSOutput8	
33	VSOutput9	
34	VSOutput10	
35	VSOutput11	
36	VSOutput12	
37	VSOutput13	
38	VSOutput14	
39	VSOutput15	
40	VSOutput16	
41	PositionEdge1	Position of sensed edges (0 to 65534) Transducer count can be used to provide conversion to desired unit of measurement. Multiply transducer count by 5.1 mm to determine complete sensor field of view.
42	PositionEdge2	
43	PositionEdge3	
44	PositionEdge4	
45	PositionEdge5	
46	PositionEdge6	
47	PositionEdge7	
48	PositionEdge8	
49	PositionEdge9	
50	PositionEdge10	
51	PositionEdge11	
52	PositionEdge12	
53	PositionEdge13	
54	PositionEdge14	
55	PositionEdge15	
56	PositionEdge16	

Customer to DSE-45 (4 words)		
Register	Parameter	Description
0	Command	Remote control command.
1	Parameter1	New position (for absolute or relative shifting)
2	Parameter2	Mask indicating which virtual sensors are included (if applicable)
3	Parameter3	Shift speed (for shifting operations)

Figure 7. Modbus default data

Remote control

Issuing commands via Modbus/TCP can control various aspects of the sensor operation. Commands are issued by writing a recognized command and its associated parameters in the respective data words designated for remote commands. The DSE-45 will act once on the initial receipt of a new command and issue feedback in the designated outgoing data words.

Depending on the command, one or more parameters are involved in the transfer. For multi-word commands, it is a generally recommended practice to clear the command word, and then write any required command parameters before writing the actual command. This ensures that the proper parameters are sent with the command.

When the DSE-45 receives a command, it is echoed in the data word RemReqCmd and additional status is updated in the data word RemReqStatus described below:
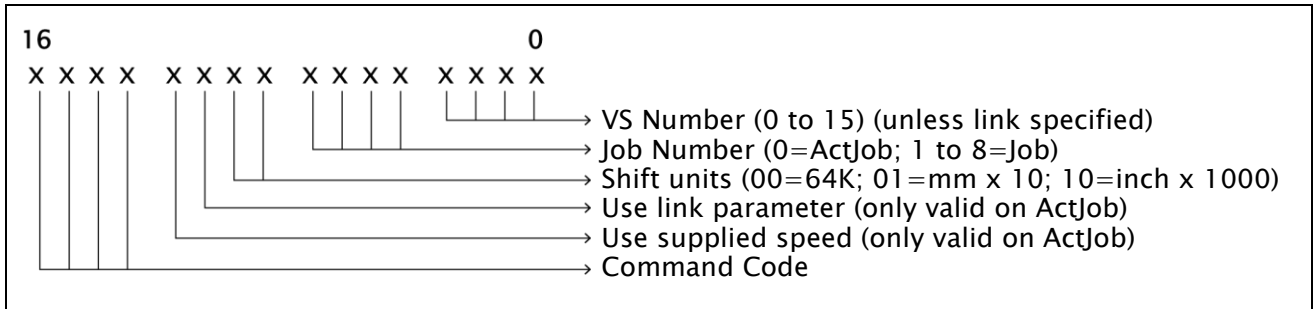
RemReqStatus values	
Value	Description
1	Command completed.
2	Command is in progress (busy).
-1	Command could not be completed.
-2	Invalid job number specified.
-3	Command not recognized.
-4	Remote control is disabled.
-5	Invalid parameter.

continued

Even though the DSE-45 acts only once on the initial receipt of a new command, after the command has completed it is recommended that the command and all parameters be cleared. The command word contains fields that are needed by some commands and ignored by others. The 16-bit command word fields are as follows:

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
CMD				LNK	SPD	UNIT		JOB				VS			

Field	Description
CMD	Command
LNK	Use Virtual Sensor Linking Mask supplied in Parameter2. (JOB must be 0)
SPD	Use shift speed supplied in Parameter3. (JOB must be 0). The shift speed is specified in mm/sec or in/sec depending on the value of the UNIT field.
UNIT	Parameter units (00=64K; 01=mm x 10; 10=inch x 1000) This allows the shift distance, proportional band, or position to be entered directly in the desired unit of measurement. *For example if mm is used, 123 = 12.3mm.*
JOB	Job number (0=active job; 1 to 8 = job number)
VS	Virtual sensor number 0 to 15. When LNK=1, command affects all linked sensors.

```
16                              0
X X X X  X X X X  X X X X  X X X X
                         └┴┴┴→ VS Number (0 to 15) (unless link specified)
                       └────→ Job Number (0=ActJob; 1 to 8=Job)
                   └────────→ Shift units (00=64K; 01=mm x 10; 10=inch x 1000)
                 └──────────→ Use link parameter (only valid on ActJob)
               └────────────→ Use supplied speed (only valid on ActJob)
         └──────────────────→ Command Code
```

Cancel	0x1000	Cancel any pending operation. This command can also be used to "ping" the sensor to verify its presence.

Command Syntax:

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
CMD				SPD	LNK	UNIT		JOB				VS			
1				0				0				0			

Parameter1   Not used.
Parameter2   Not used.
Parameter3   Not used.

Response:

RemReqCmd   Duplicates the supplied command.
RemReqStatus   1 = Command completed.
RemReqParam1   Not used.

Select Job	0x20x0	Select a new job.

Command Syntax:

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
CMD				SPD	LNK	UNIT		JOB				VS			
2				0				X				0			

Parameter1   Not used
Parameter2   Not used
Parameter3   Not used

JOB   New job number 1 through 8. The requested job number must have been previously enabled or the command fails.

Response:

RemReqCmd   Duplicates the supplied command.
RemReqStatus   1 = Command completed.
                 –2 = Invalid job.
RemReqParam1   Not used.

Move VS Absolute			0x4xxx		Move virtual sensor to an absolute position.				

Command Syntax:

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
CMD				SPD	LNK	UNIT		JOB				VS			
4				X				X				X			

Parameter1   Required   Positive value indicating the desired virtual sensor position. It is interpreted according to the UNIT field described below.

Parameter2$_1$ Optional   Parameter used when LNK = 1 to move one or more virtual sensors when the target virtual sensor moves.

Parameter3$_1$ Optional   Parameter used when SPD = 1 to control the shift speed. This parameter is interpreted as specified by the UNIT field.

VS   Specifies the target virtual sensor to move. (0x0=VS1; 0xF=VS16).

JOB   Job number to apply the virtual sensor(s) relocation. A job number of 0 will apply the move to the currently active job, but a value from 1 to 8 can be supplied to move the virtual sensors of other jobs prior to selecting them.

UNIT   The UNIT field specifies the measurement units used to interpret the supplied virtual sensor location in Parameter1. This setting also specified how the optional shift speed is interpreted (mm/sec x 10 or inches/sec x1000).

- **00** = All parameters are interpreted using 0 to 65534 scaling. The optional shift speed is treated as mm/sec x 10.
- **01** = Parameters are interpreted as mm x 10. Optional shift speed is interpreted as mm/sec x 10.
- **10** = Parameters are interpreted as inches x 1000. Optional shift speed is interpreted as inches/sec x 1000.
- **11** = Reserved, handled same as 00.

SPD$_1$ The SPD bit specifies the use of a shift speed parameter supplied in Parameter3.

- 1 = Use Parameter3 to specify the shift speed.
- 0 = Move the sensor(s) immediately to the specified location.

The shift speed in Parameter3 is interpreted according to the UNIT field.

LNK$_1$ The LNK bit specifies if one or more virtual sensors should be linked to the target virtual sensor specified in the VS field. This allows multiple sensors to be moved concurrently relative to the target sensor.

- 1 = Use the mask in Parameter2 to link one or more sensors.
- 0 = Parameter2 is not used.

continued

Parameter2 mask: (set the target virtual sensor bit and any additional bits to link multiple virtual sensors)

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
VS16	VS15	VS14	VS13	VS12	VS11	VS10	VS9	VS8	VS7	VS6	VS5	VS4	VS3	VS2	VS1

Response:

RemReqCmd	Duplicates the supplied command.
RemReqStatus	1 = Command completed.
	2 = Command is in progress (shifting).
	Negative value indicates an error (see RemReqStatus values described previously).
RemReqParam1	Not used.

Note 1 – The SPD and LNK options should only be used when the JOB field is 0, as they would have no effect when shifting any job other than the currently active job

Move VS Relative	0x5xxx	Move virtual sensor relative to its current position.

Command Syntax:

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
CMD				SPD	LNK	UNIT		JOB				VS			
5				X				X				X			

Parameter1   Required   Signed value indicating the desired distance and direction to move the specified virtual sensor. It is interpreted according to the UNIT field described below.

Parameter2$_1$ Optional   Parameter used when LNK = 1 to move one or more virtual sensors when the target virtual sensor moves.

Parameter3$_1$ Optional   Parameter used when SPD = 1 to control the shift speed. This parameter is interpreted as specified by the UNIT field.

VS   Specifies the target virtual sensor to move. (0x0=VS1; 0xF=VS16).

JOB   Job number to apply the virtual sensor(s) relocation. A job number of 0 will apply the move to the currently active job, but a value from 1 to 8 can be supplied to move the virtual sensors of other jobs prior to selecting them.

UNIT   The UNIT field specifies the measurement units used to interpret the supplied virtual sensor location in Parameter1. This setting also specified how the optional shift speed is interpreted (mm/sec x 10 or inches/sec x1000).

- **00** = All parameters are interpreted using 0 to 65534 scaling. The optional shift speed is treated as mm/sec x 10.
- **01** = Parameters are interpreted as mm x 10. Optional shift speed is interpreted as mm/sec x 10.
- **10** = Parameters are interpreted as inches x 1000. Optional shift speed is interpreted as inches/sec x 1000.
- **11** = Reserved, handled same as 00.

SPD$_1$ The SPD bit specifies the use of a shift speed parameter supplied in Parameter3.

- 1 = Use Parameter3 to specify the shift speed.
- 0 = Move the sensor(s) immediately to the specified location.

The shift speed in Parameter3 is interpreted according to the UNIT field.

LNK$_1$ The LNK bit specifies if one or more virtual sensors should be linked to the target virtual sensor specified in the VS field. This allows multiple sensors to be moved concurrently relative to the target sensor.

- 1 = Use the mask in Parameter2 to link one or more sensors.
- 0 = Parameter2 is not used.

continued

Parameter2 mask: (set the target virtual sensor bit and any additional bits to link multiple virtual sensors)

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
VS16	VS15	VS14	VS13	VS12	VS11	VS10	VS9	VS8	VS7	VS6	VS5	VS4	VS3	VS2	VS1

Response:

     RemReqCmd   Duplicates the supplied command.

     RemReqStatus   1 = Command completed.

                          2 = Command is in progress (shifting).

                          Negative value indicates an error (see RemReqStatus values described previously).

Note 1 – The SPD and LNK options should only be used when the JOB field is 0, as they would have no effect when shifting any job other than the currently active job.

Learn Edges	0x6000	Build a virtual sensor centered on each edge located in the sensor. The virtual sensor numbers are assigned sequentially from the closed end of the sensor to the open end.

Command Syntax:

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
CMD				SPD	LNK	UNIT		JOB				VS			
6				0				0				0			

     Parameter1   Not used

     Parameter2   Not used

     Parameter3   Not used

Response:

     RemReqCmd   Duplicates the supplied command.

     RemReqStatus   1 = Command completed.

     RemReqParam1   Number of virtual sensors built.

Set PB Size	0x9xx0	Set the virtual sensor proportional band size.

Command Syntax:

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
CMD				SPD	LNK	UNIT		JOB				VS			
9				X				X				0			

Parameter1   Required   Specifies the new virtual sensor proportional band size. All virtual sensors in the selected job will use the specified size.

Parameter2   Not used

Parameter3   Not used

JOB   Job number to set proportional band. A job number of 0 will change the proportional band size of the currently active job. A value from 1 to 8 can be supplied to change the proportional band size of other jobs prior to selecting them.

UNIT   The UNIT field specifies the measurement units used to interpret the supplied virtual sensor proportional band size in Parameter1.
- **00** = Size in Parameter1 is scaled from 0 to 65534 (complete field of view).
- **01** = Size in Parameter1 is interpreted as mm x 10.
- **10** = Size in Parameter1 is interpreted as inches x 1000.
- **11** = Reserved, handled same as 00.

Response:

RemReqCmd   Duplicates the supplied command.

RemReqStatus   1 = Command completed.

                                –2 = Invalid job.

                                –5 = Invalid parameter.

RemReqParam1   Not used.

Web page access

The DSE-45 contains an integrated HTTP server that provides web page access to the sensor configuration parameters. This requires an optional Ethernet cable connected to a network device, such as a PC, that contains a web browser.

To communicate with the DSE-45, the PC and the web browser must be configured to match the DSE-45 network settings. The default network settings for the DSE-45 web page are as follows.

IP address	10.0.0.150
Subnet Mask	255.0.0.0
Gateway	10.0.0.1
DHCP	Off

After communication has been established, these settings can be changed.

The DSE-45 web page uses tabs to navigate between features. See *Tab Descriptions* starting on *page 6.2*
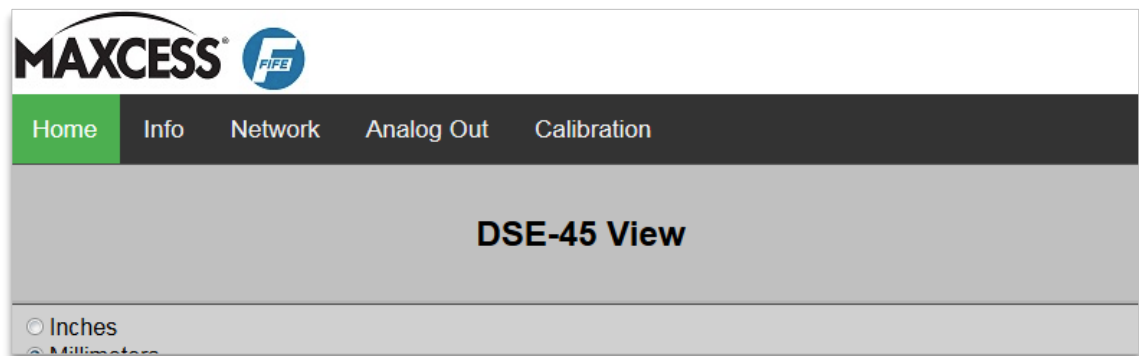
Figure 8. DSE-45 web page tabs

DSE-45 web page tab descriptions

Home is displayed when communication is first established with the DSE-45. It contains information about the job that is currently running and provides an animation that reflects the state of the web(s) in the sensor field of view.
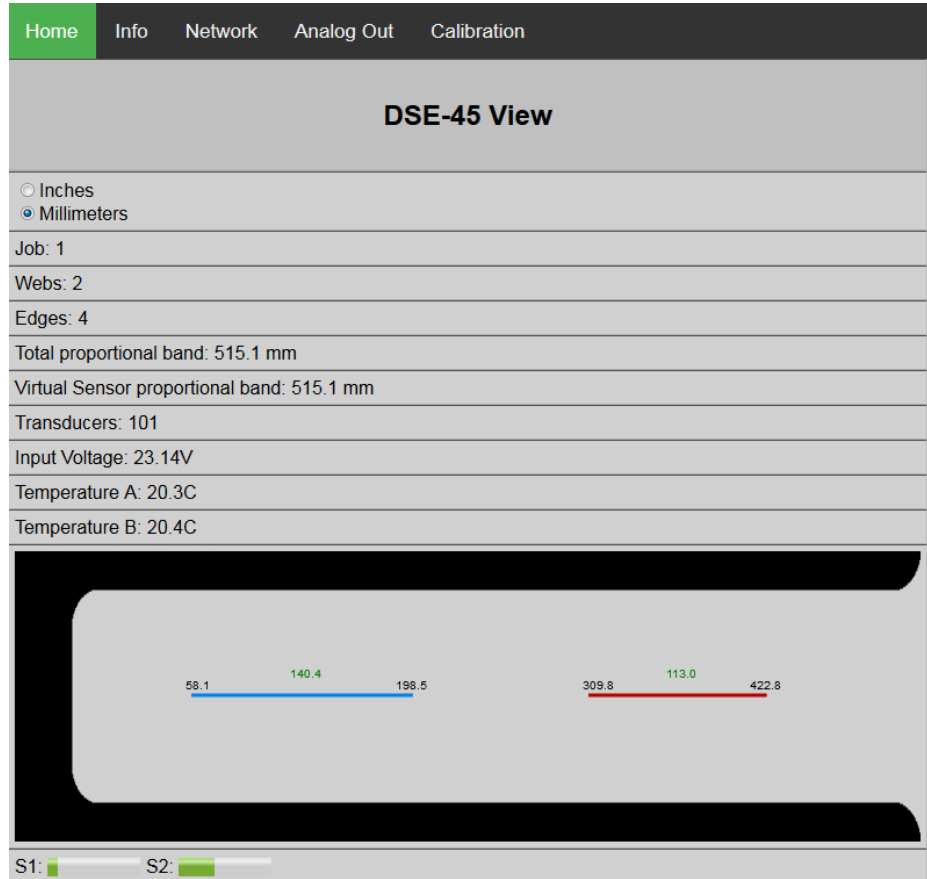
Info contains information about the sensor, such as Serial Number, Network Settings, Firmware and Software versions, Proportional Band size (including the number of transducer pairs that make up the Proportional Band) and other info related to the configuration of the sensor. The values displayed on this tab cannot be edited.

Home	Info	Network	Analog Out	Calibration

Device Information

Model Number	DSE-45
Serial Number	00000001
MAC address	00:0F:87:00:00:71
IP address	10.0.0.150
Subnet Mask	255.0.0.0
Gateway	10.0.0.1
DHCP	OFF
MaxNet ID	10
MaxNet Cycle Time	5 ms
Hardware ID	0x4A
Firmware Version	Feb 17 2020-020
Software Version	101500-001
FPGA Build Date/Time	2019/10/28 12:13:12
Firmware Build Date/Time	Feb 17 2020 09:30:37
Proportional Band	101 transducers: 515.10mm (20.280in)
Independent Transducer Calibration	Default (Unictron)
Scan Operation Mode	Guiding

Network contains network settings that can be edited. To change any of the settings located on this tab, enter the desired value in the proper field and then click on the "Apply Changes" button.

The changes are sent to the sensor but are not yet effective. You must cycle the power to the sensor for these changes to take effect.

The MaxNet ID is important only if the sensor is communicating with another Fife network device incorporating the MaxNet protocol, such as a D-MAX Controller or Operator Interface.

The MaxNet Cycle Time should remain the default, unless a change is necessary to reduce network traffic.

| Home | Info | Network | Analog Out | Calibration |

Network Configuration

IP address	10.0.0.150
Subnet Mask	255.0.0.0
Gateway	10.0.0.1
DHCP	OFF ▾
MaxNet ID (1-31)	10
MaxNet Cycle Time x 5ms (max=255; default=1)	1

Apply Changes

Analog output configuration contains fields that apply to the analog outputs. These fields can be edited:

1. Enter the desired value in the proper field, and then
2. Click the "Apply Changes" button.

The changes are effective immediately.

There are four configurable analog outputs, controlled by three configurable signal sources. The analog channels can be independently configured for each Job that is enabled. The analog channels are as follows:

Analog Channel 1 (Connector X3, pin 8)
Analog Channel 2 (Connector X3, pin 5)
Analog Channel 3 (Connector X3, pin 2 & Connector X2, pin 4)

See *parameter descriptions; page 6.6.*

Analog output parameter descriptions

Signal source

The source of the signal that controls the analog outputs via the analog channels. (The source can be configured for each of the three analog channels, and for each Job, independently).

Analog Channels 1 and 2, by default, provide edge position (the first on-web edge detected and the first off-web edge detected, respectively).

Analog Channel 3, by default, provides web width measurement. (Analog Channel 3 controls two analog outputs, which are located, one each, on connectors X2 and X3, for accessibility in various applications).

Any signal produced by the DSE-45 can be mapped to the analog channels, up to and including duplicating the same signal on all outputs, if desired. The signal selections are as follows.

VS 1...VS 16 (Virtual Sensors)
Edge 1...Edge 16 (Edge Positions)
WebWidth 1...WebWidth 8 (Web Width)

The default mode maps the analog channels as follows (VS1 and VS2 are equivalent to Edge 1 and Edge 2 while in Single Proportional Band Mode).

Analog Channel 1 = VS 1 (Virtual Sensor 1)
Analog Channel 2 = VS 2 (Virtual Sensor 2)
Analog Channel 3 = WebWidth 1 (Web Width 1)

Output type

The range of the analog outputs can be set to any of the following. (The output range can be configured independently for each of the three analog channels and for each job).

OFF (0 mA)
 0 to 10 mA (default)
 0 to 20 mA
 4 to 20 mA

Polarity

The polarity of each analog output, in relation to the source signal, can be set independently for each output and for each job. The default polarity setting for all analog outputs is positive (+).

Calibration contains a means to calibrate the sensor to the material being guided. (This calibration is independent from Sensor Calibration in the Fife Controller/Processor). The DSE-45 is factory-calibrated to an acoustically opaque material. Generally, it is not necessary to recalibrate the sensor. If the material to be guided is not acoustically opaque, it may be possible to improve the performance of the sensor by performing this calibration.

To calibrate

Click the button, and then follow the on-screen instructions. After calibration is complete, the total number of transducers present, and their respective statistics, is displayed. (The statistics are for evaluation purposes only and do not reflect the overall performance of the sensor).

To restore the factory calibration values, click on the "Restore Factory Calibration" button.

Home	Info	Network	Analog Out	Calibration

Calibration

Calibration requires the sensor to be exposed to the following conditions sequentially:

- Remove all material from the sensor field of view (to learn the no-web signal levels)
- Fully block the sensor field of view with the material to be guided (to learn the web opacity)

Disclaimer: Performing this operation will overwrite the factory-calibrated transducer gain factors,which can have adverse effects on the sensor linearity performance and web width measurement accuracy.

[Start Calibration] [Restore Factory Calibration]

Transducer Statistics

35 transducers present. (Best/Worst statistics)

Transducer #	Minimum	Maximum	Gain
1	108	8893	1909
2	158	9158	1864
3	90	9688	1747
4	179	9360	1827
5	114	9998	1697
6	127	9724	1748
7	117	9411	1805
8	84	9831	1721
9	125	7162	2383
10	111	9311	1823
11	119	9491	1790
12	27	11910	1411
13	121	9385	1810
14	65	9973	1693
15	108	10054	1686
16	101	8963	1893

DSE-45 home screen

ℹ️ The information and procedures in this section assume the use of an optional Ethernet cable, connecting the DSE-45 to a network device, such as the D-MAX Operator Interface.
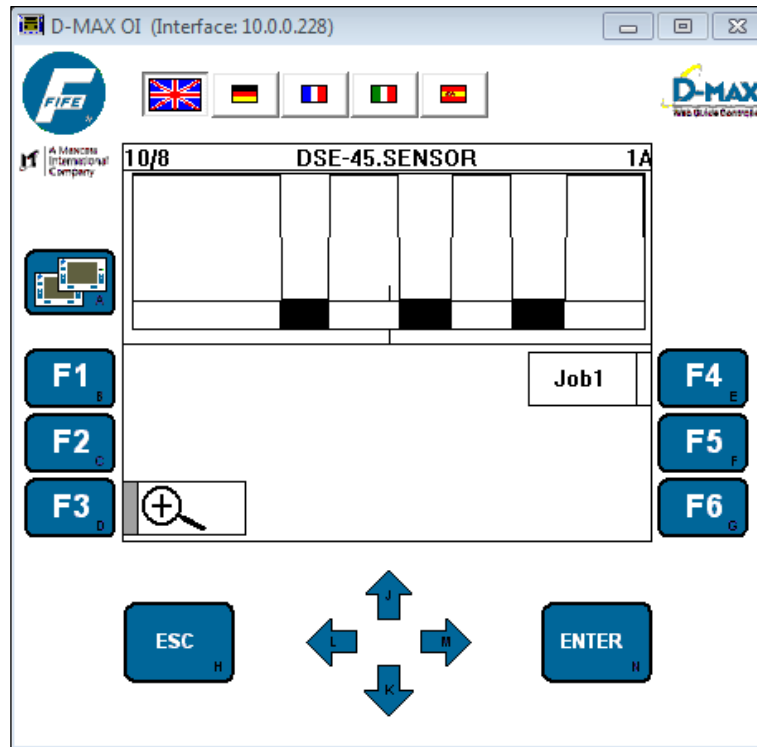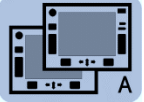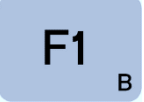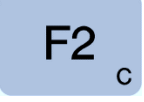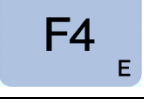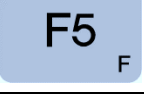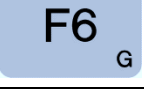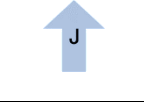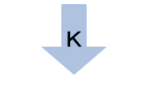

Figure 9. DSE-45 home screen

- – Press the ENTER key to enter menu mode or advance to the next menu level.

- – Press the ESC key to return to the previous menu level.

- – Use the UP/DOWN arrow keys to scroll through the list of items in a menu level.

- – Use the LEFT/RIGHT arrow keys while in the sub menus to edit values.

- – If a change is made, press the ENTER key to save the change or press the ESC key to abort the change.

Key (button) definitions

	A. Screen Select key This key is used to scroll through the devices that exist on the network. Hold the key for at least two seconds to display a list of the devices.
F1 B	**B. F1 key** This key is not used by the DSE-45.
F2 C	**C. F2 key** This key is not used by the DSE-45.
F3 D	**D. F3 key** This key is not used by the DSE-45.
F4 E	**E. F4 key** This key is defined by the graphics located next to it in the display.
F5 F	**F. F5 key** This key is defined by the graphics located next to it in the display.
F6 G	**G. F6 key** This key is defined by the graphics located next to it in the display.
ESC H	**H. ESC key** This key is not used in the home screen. In the menu levels, this key is used to cancel a change or to exit menu levels. Hold the key or press repeatedly to return to the DSE-45 home screen.
⬆ J	**J. Up Arrow key** In the menu levels, this key is used to scroll up the list of menu entries and to edit values.
⬇ K	**K. Down Arrow key** In the menu levels, this key is used to scroll down the list of menu entries and to edit values.

continued

|	
L	**L. Left Arrow key** In the menu levels, this key is used to enable/disable entries in the displayed list and to move the cursor when editing values.
M	**M. Right Arrow key** In the menu levels, this key is used to enable/disable entries in the displayed list and to move the cursor when editing values.
ENTER N	**N. Enter key** On the DSE-45 home screen, this key is used to enter the menus for configuring or monitoring the DSE-45. In the menu levels, this key is used to enter a menu or initiate the action that is selected in the displayed list. It is also used to save a change.

Menu navigation

i   The information and procedures in this section assume the use of an optional Ethernet cable, connecting the DSE-45 to a network device, such as the D-MAX Operator Interface.
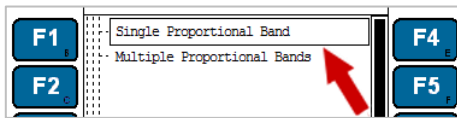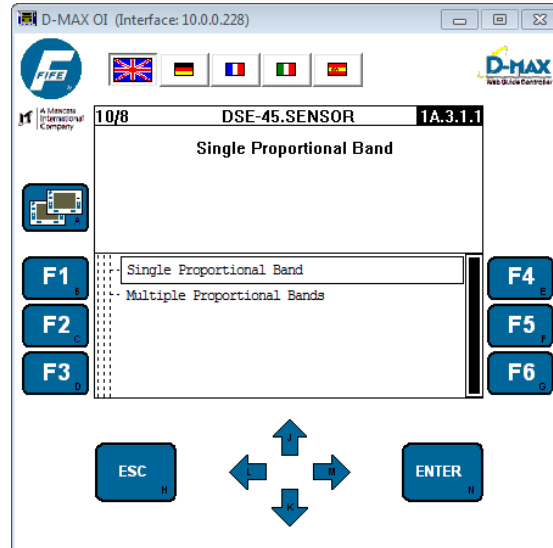
While in these menus, the selected entry is surrounded by a rectangular box and is shown in the information area of the display. If the selected entry can be enabled/disabled, highlighting indicates enabled.
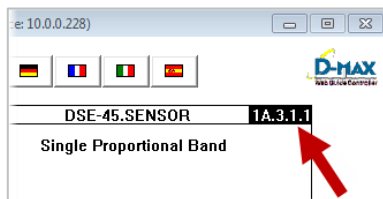
In the menu structure, the 'X' in the 'Status #' varies according to other parameters, such as Job Selection, Mode Selection, etc.
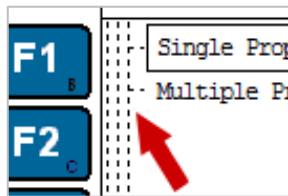
The column of bars located to the left of the list of menu entries indicates the menu level currently selected. The number of columns of bars will match the number of periods contained in the "Status Number" located in the upper-right corner of the display.

While in any of the menus, press the ESC key once to switch the previous level.

To return to the home screen, press and hold the ESC to continue switching back.

1X.3

Setting up a job

ENTER ₙ At the home screen, press to enter the Job Settings menu.

The following menu structure illustrates sensor operation modes and features for each mode.
Set Sensor Mode; page 8.2.

From the DSE-45 Home Screen, press the ENTER key to enter the menus, select "Job Settings", then press ENTER.

Status #				
1X.3	Job Settings			
1X.3.1		Set Sensor Mode		
1X.3.1.1			Single Proportional Band	
1X.3.1.1.1				Use Single Proportional Band
				(Press the Enter key to select Single Proportional Band).
1X.3.1.2			Multiple Proportional Band	
1X.3.1.2.1				Proportional Band Size
1X.3.1.2.1.1				Use the Arrow keys to set the desired value.
1X.3.1.2.2				Learn Edges
				(Press the Enter key to learn the position of the current web edges).
1X.3.1.2.3				Sensor Linking
1X.3.1.2.3.1				Virtual Sensor 1
1X.3.1.2.3.2				Virtual Sensor 2
1X.3.1.2.3.3				Virtual Sensor 3
1X.3.1.2.3.4				Virtual Sensor 4
1X.3.1.2.3.5				Virtual Sensor 5
1X.3.1.2.3.6				Virtual Sensor 6
1X.3.1.2.3.7				Virtual Sensor 7
1X.3.1.2.3.8				Virtual Sensor 8
1X.3.1.2.3.9				Virtual Sensor 9
1X.3.1.2.3.10				Virtual Sensor 10
1X.3.1.2.3.11				Virtual Sensor 11
1X.3.1.2.3.12				Virtual Sensor 12
1X.3.1.2.3.13				Virtual Sensor 13
1X.3.1.2.3.14				Virtual Sensor 14
1X.3.1.2.3.15				Virtual Sensor 15
1X.3.1.2.3.16				Virtual Sensor 16

Use the Up/Down Arrow keys to scroll to the desired entry. Then, use the Left and Right Arrow keys to highlight the desired virtual sensors to be linked, then press the Enter key to save the settings.

Figure 10. Job setting menu structure

Set sensor mode

1X.3.1.1
Single proportional band

In Single Proportional Band, the position of each edge is in relation to the full proportional band of the sensor.
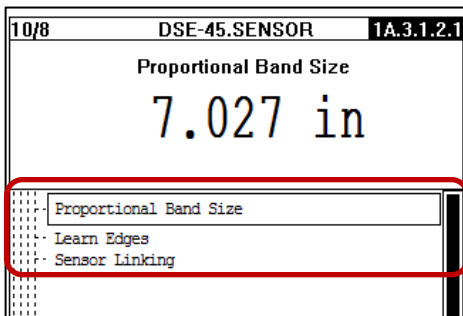
ENTER Press to select Single Proportional Band [1X.3.1.1.1]

1X.3.1.2

Multiple proportional band

In Multiple Proportional Band, the position of each edge is in relation to the proportional band of the virtual sensor in which the edge is located.

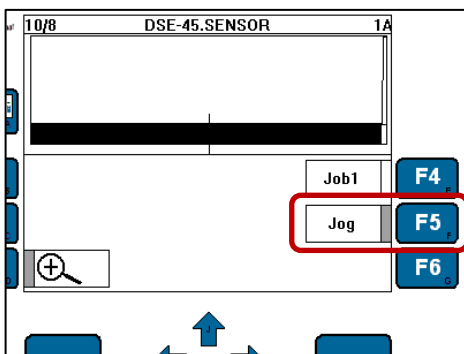If Multiple Proportional Band is selected, the following features can be configured:

1X.3.1.2.1 Proportional band size

1X.3.1.2.2 Learn edges

1X.3.1.2.3 Virtual sensor linking

See *full descriptions; page 8.4.*

During Multiple Proportional Band operation mode, the F5 key on the home screen is labeled **Jog**. This key provides a means to shift or otherwise manipulate the virtual sensors.

See Jogging the Virtual Sensors; page 9.1.

1X.3.1.2.1 Proportional band size

In Multiple Proportional Band, the size of the virtual sensors can be changed. Changes in this parameter are applied to all virtual sensors and take effect immediately.

The minimum size of the virtual sensors is 10.2 mm [0.402 inches]. The maximum size of the virtual sensors is equal to the full sensor field of view.

1X.3.1.2.2 Edge learning

Edge Learning is required when using the Multiple Proportional Band mode. It provides a method to automatically build virtual sensor(s) based on the position of webs that are placed in the sensor field of view. The number of virtual sensors built depends on the number of web edges detected.

When initiated, Edge Learning configures a virtual sensor of the specified proportional band size and proper polarity for each edge found within the sensor field of view at the moment it is initiated. The center of each virtual sensor is located at the respective web edge position.

If, during the learning process, an edge is too close to either end of the sensor field of view to keep the virtual sensor centered on the edge, the virtual sensor will be shifted to the field of view limit and will preserve the configured proportional band size.

1X.3.1.2.3 Virtual sensor linking

Virtual Sensor Linking provides a method to link the position of two or more virtual sensors together. If one of the virtual sensors is shifted, all of the virtual sensors that are linked to that virtual sensor will follow it as it shifts.

1X.4 Select job

⚠️ Job selection changes must be performed with the Controller/Processor in either Manual mode or Servo-Center mode only.

To enter the Select Job menus, follow the Select Job menu structure in Figure 5.

Use these menus to select the desired job. (If the desired job is not listed, go to the Control Options > Job Enable menus).

Select job menu structure

From the SE-45 Home Screen, press the ENTER key to enter the menus, select "Select Job", then press ENTER.

Status #		
1X.4	Select Job	
1X.4.1		(A) Job1
1X.4.2		(B) Job2
1X.4.3		(C) Job3
1X.4.4		(D) Job4
1X.4.5		(E) Job5

This list will vary, depending on the Jobs that are enabled. Use the Up and Down Arrow keys to scroll to the desired Job, then press the Enter key to select that Job. (To enable other jobs, go to "Job Enable" under "Control Options").

Figure 11. Select job menu structure

Calibrate transducers

Calibration is necessary when using materials that are acoustically transparent. To properly detect material edges, each transducer channel will need to register as "covered" below a higher signal level threshold than with acoustically opaque materials.

Use the Hardware Settings menu (Figure 12) to calibrate the transducers.

1. **Uncover Transducers**. Remove any blockage from the sensor gap, and then press the Enter key to continue. (The no-web signal level will be learned).
2. **Cover Transducers**. Wait for this menu item to be highlighted, and then completely block the sensor gap with a sample of the web to be guided, then press the Enter key to continue. (The web opacity will be learned).
3. **Save Settings**. Wait for this menu to be highlighted, and then press the Enter key to save the calibration.

Hardware settings menu structure

From the SE-45 Home Screen, press the ENTER key to enter the menus, select "Hardware Settings", then press ENTER.

Status #			
1X.5	Hardware Settings		
1X.5.1		Calibrate Transducers	
1X.5.1.1			1. Uncover Transducers
1X.5.1.2			2. Cover Transducers
1X.5.1.3			3. Save Settings

Figure 12. Hardware settings menu structure

Control options

To view or modify any of the following, follow the Control Options menu structure in Figure 13.

Job enable
Use these menus to enable/disable the desired jobs.

Remote control
Use these menus to enable or disable control from remote devices; you can set control as ON or OFF.

Length unit
Use these menus to set the units (mm or inch) that are displayed and used in various menus.

Control options menu structure

From the SE-45 Home Screen, press the ENTER key to enter the menus, select "Control Options", then press ENTER.

Status #				
1X.6	Control Options			
1X.6.1		Job Enable		
1X.6.1.1			(A) Job1	
1X.6.1.2			(B) Job2	Use the Up and Down Arrow keys to scroll to the desired Job. Use the Left and Right Arrow keys to highlight the desired Job (enable the job), and then press the ENTER key to store the change. (The contents of this list may vary).
1X.6.1.3			(C) Job3	
1X.6.1.4			(D) Job4	
1X.6.1.5			(E) Job5	
1X.6.1.6			(F) Job6	
1X.6.1.7			(G) Job7	
1X.6.1.8			(H) Job8	
1X.6.2		Remote Control		
1X.6.2.1			ON	Use the Up and Down Arrow keys to highlight the desired setting, then press the Enter key to save the setting.
1X.6.2.2			OFF	
1X.6.3		Length Unit		
1X.6.3.1			mm	Use the Up and Down Arrow keys to highlight the desired setting, then press the Enter key to save the setting.
1X.6.3.2			in	

Figure 13. Control options menu structure

Configuration

To view or modify any of the Configuration Settings, follow the menu structure in Figure 14.

Names
Use these menus to view or modify the Device and Usage names of the selected Controller.

Serial Number
The Model Number and Serial Number of the DSE-45 (Device) are displayed.

FW Number
The number of the Firmware installed in the DSE-45 (Device) is displayed.

SW Number
The number of the Software installed in the DSE-45 (Device) is displayed.

Distributed System
Use these menus to view or modify the Application ID and Sub Function. *See Application Filtering; page 9.2.*

Configuration menu structure

From the SE-45 Home Screen, press the ENTER key to enter the menus, select "Configuration", then press ENTER.

Status #			
1X.7	Configuration		
1X.7.1		Names	
1X.7.1.1			Device
1X.7.1.1.1			Use the arrow keys to edit, then press Enter to save.
1X.7.1.2			Usage
1X.7.1.2.1			Use the arrow keys to edit, then press Enter to save.
1X.7.2		Serial Number	(The Sensor Serial Numbers are displayed)
1X.7.3		FW Number	(The Sensor Firmware Number is displayed)
1X.7.4		SW Number	(The Sensor Software Number is displayed)
1X.7.5		Distributed System	
1X.7.5.1			Application ID
1X.7.5.1.1			Use the arrow keys to edit, then press Enter to save.
1X.7.5.2			Sub Function
1X.7.5.2.1			Use the arrow keys to edit, then press Enter to save.

Figure 14. Configuration menu structure

Network

TCP/IP

Use Network menus to view or edit the Ethernet IP-Address, Subnet Mask, or Gateway. Also, use this menu to enable or disable (ON/OFF) DHCP.

ⓘ If DHCP is set to ON and the DHCP Server is not connected or operating at the time the DSE-45 is powered up, after 30 seconds the DSE-45 adopts the currently stored IP Address so that the system can initialize. After the DHCP Server is connected and operating properly, all network devices configured for DHCP must be power-cycled to allow the DHCP Server to assign a new IP Address.

MAXNET

Use these menus to view or edit the MAXNET Address.

MAC-ID

Use this menu to view the DSE-45 MAC-ID (Physical Address).

Network menu structure

From the SE-45 Home Screen, press the ENTER key to enter the menus, select "Network", then press ENTER.				
Status #				
1X.8	Network			
1X.8.1		TCP/IP		
1X.8.1.1			IP-Address	
1X.8.1.1.1				Use the arrow keys to edit, then press Enter to save the setting.
XX.8.1.2			Subnet Mask	
1X.8.1.2.1				Use the arrow keys to edit, then press Enter to save the setting.
1X.8.1.3			Gateway	
1X.8.1.3.1				Use the arrow keys to edit, then press Enter to save the setting.
1X.8.1.4			DHCP	
1X.8.1.4.1				ON — Use the Arrow keys to highlight the desired setting, then
1X.8.1.4.2				OFF — press Enter to save the setting.
1X.8.2		MAXNET		
1X.8.2.1			MAXNET Address	
1X.8.2.1.1				Use the arrow keys to edit.
1X.8.3		MAC-ID	(The sensor MAC-ID is displayed)	

Figure 15. Network menu structure

Service menu

To view any of the Service menus, follow the *Service Menu Structure; page 11.*

Measuring points

Use these menus to view the current values of the DSE-45 output signals, various power points, internal temperatures, and network statuses.

Service menu structure

From the SE-45 Home Screen, press the ENTER key to enter the menus, select "Service", then press ENTER.

Status #					
1X.9	Service				
1X.9.1		Measuring Points			
1X.9.1.1			Signals		
1X.9.1.1.1				Edges	
1X.9.1.1.1.1					Edge 01:XXX.X	The position of the currently detected edges is displayed. If no edges are detected, this list is blank. This list will vary. Use the F4 key to select the type of number displayed.
1X.9.1.1.1.2					Edge 02:XXX.X
1X.9.1.1.1.3					Edge 03:XXX.X
1X.9.1.1.1.4					Edge 04:XXX.X
1X.9.1.1.2				Virtual Sensors	
1X.9.1.1.2.1					VS 01: XXXXX	The position of currently detected edges in the Virtual Sensors is displayed. This list will vary. Use the F4 key to select the type of number displayed.
1X.9.1.1.2.2					VS 02: XXXXX
1X.9.1.1.2.3					VS 03: XXXXX
1X.9.1.1.2.4					VS 04: XXXXX
1X.9.1.1.3				Web Width	
1X.9.1.1.3.1					WebWidth 01: XXX.X	The width of webs currently detected is displayed. If no edges are detected, this list is blank. This list will vary. Use the F4 key to select the desired number type.
1X.9.1.1.3.2					WebWidth 02: XXX.X
1X.9.1.1.3.3					WebWidth 03: XXX.X
1X.9.1.1.3.4					WebWidth 04: XXX.X
1X.9.1.1.4				Web Centerline	
1X.9.1.1.4.1					WebCL 01: XXX.X	The centerline of the currently detected webs is displayed. If no edges are detected, this list is blank. This list will vary. Use the F4 key to select the desired number type.
1X.9.1.1.4.2					WebCL 02: XXX.X
1X.9.1.1.4.3					WebCL 03: XXX.X
1X.9.1.1.4.4					WebCL 04: XXX.X
1X.9.1.2			Power		
1X.9.1.2.1				Input Voltage	(Input Voltage is displayed).
1X.9.1.2.2				Temperature A [°C]	(Internal Temperature A is displayed).
1X.9.1.2.3				Temperature B [°C]	(Internal Temperature B is displayed).
1X.9.1.2.4				-6V	(-6V Supply value is displayed).
1X.9.1.2.5				+6V	(+6V Supply value is displayed).
1X.9.1.2.6				RCAL	(RCAL value is displayed).
1X.9.1.3			Network		
1X.9.1.3.1				#XX: SE-45 (10.0.0.XXX) (this)	This list of devices detected on the network will vary with the devices detected.
1X.9.1.3.2				#XX: D-MAX (10.0.0.XXX)
1X.9.1.3.3				#XX: D-OI (10.0.0.XXX)

Figure 16. Service menu structure

Jog virtual sensors
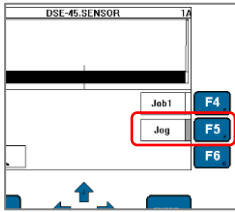
The Jog function allows the operator to shift the position of selected virtual sensors. If multiple virtual sensors are linked, the linked virtual sensors will follow the shifted virtual sensor.

If the sensor mode setting is Multiple Proportional Band, the *Jog* command will be displayed next to the F5 key on the DSE-45 home screen.

1. Press F5 to enter the *Jog* menus. A list of the currently available virtual sensors is displayed. The list will vary depending on the web edges that are currently detected.

2. Use the UP/DOWN arrow keys to select the desired virtual sensor to be shifted.

Status #		
1X	F5	The value of 'X' in the Status # on the display is determined by the selected job: A=Job1, B=Job2, etc.)
1X.1		VS 01: XXXXX
1X.2		VS 02: XXXXX
1X.3		VS 03: XXXXX
1X.4		VS 04: XXXXX

This is a list of the Virtual Sensors. This list will vary, depending on the web edges that are currently detected.

Figure 17. Jog menu structure

3. Use for a *relative* shift of the selected virtual sensor; the position value will be updated as the virtual sensor is shifted. Linked sensors will follow.

4. Use for an *absolute* shift of the selected virtual sensor; press Enter, and then use UP/DOWN arrow keys to set the desired position. The virtual sensor will move as the value is modified. Linked sensors will follow.

5. Save the change, or

Cancel the change and return to the previous position.

While in this menu, the following functions are available:

Use to change the units (inch, mm, or decimal) that are displayed.

Use to learn new edges

Use to link or unlink specific virtual sensors

Application filtering

Refer to the Application Filtering Examples on the pages following these

The DSE-45 can be configured so that a D-MAX Operator Interface (OI) will be denied communication with the DSE-45. This may be desired so that unauthorized personnel do not have access to the internal settings of the DSE-45.

For further explanation and examples of Application Filtering, refer to:

D-MAX User Manual, Figure Sheet 1-886 or
D-MAXE User Manual, Figure Sheet 2-296

Configuring the system for application filtering

To configure the system for Application Filtering, the Application ID number and Sub Function number must be assigned to each DSE-45 from an operator interface that has filtering turned off.

- The Application ID Number (1 thru 31) represents an application group of devices. An application can be made up of one or more devices; it may consist of just one DSE-45. All devices in an application group must have a common application ID number. Each application group must have a unique Application ID number. The application ID is used to determine the order that the devices are displayed in the list of devices on the "All Devices" screen of the operator interface.

continued

- The Sub Function Number represents the function of the device in an application. The default setting for the Sub Function is 0 (zero). For an operator interface to communicate with only a specific device in multiple applications, the primary device in each application that is to be controlled by the operator interface must have the Sub Function set to 0 (zero). The Sub Function number for the other devices on the network must be set to a number other than zero (1 to 4).

Configure the Application Filtering parameters of each device in the network by performing the appropriate procedures:

Step 1. Configure a DSE-45 sensor; *page 9.4.*

Step 2. Configure the Operator Interface to do one of the following:
    a. "Hide" the DSE-45 so it does not show up is the list of devices; *page 9.5.*
    b. Communicate with a primary device or devices in all application groups; *page 9.6.*
    c. Communicate with all of the devices in a specific application group; *page 9.7.*

Configure the DSE-45

Reference: *Configuration Menu Structure, page 8.8.*

1. From an operator interface, select the desired DSE-45.

2. From the DSE-45 Home Screen, press the ENTER key to enter the sensor menus.

3. Select "Configuration", and then press the ENTER key.

4. Select "Distributed System", and then press the ENTER key.

5. Select "Application ID", and then press the ENTER key.

6. Use the arrow keys to set the Application ID number (1 thru 31) (0 disables Application Filtering), and then press the ENTER key to store the change. (If other Devices in the network have Application ID numbers assigned, the application will dictate if the Application ID number in this DSE-45 should match, or not match, the number in the other Devices).

7. Select "Sub Function", then press the ENTER key.

8. Use the arrow keys to set the Sub Function number (0 thru 4), and then press the ENTER key to store the change.

9. Press the ESC key until the DSE-45 home screen is reached.

10. Repeat this procedure on other sensors, as desired.

Configure the operator interface

The next step is to configure the Operator Interface unit(s) that will be communicating with the configured DSE-45 sensor(s) by performing the procedure for your chosen option.

Option 1.

To "hide" a DSE-45 sensor so that it does not show up in the list of devices on the operator interface, perform the following procedure.

🖳 A	Press longer than two seconds	1.a
F6 G	⬆ or ⬇ → Control Options	1.a.2
ENTER N	⬆ or ⬇ → Application Filter	1.a.2.2

1. From the home screen of the operator interface, press and hold the SELECT (A) key for at least two seconds to obtain access to the Operator Interface Local Menus, and then press the F6 key to enter the OI Menus.

2. In the OI Menus, select "Control Options"; press ENTER.

3. Select "Application Filter"; press ENTER.

4. Select "Filter Type"; press ENTER.

5. Select "Selected Application", and then press ENTER to store the change.

6. Next, select "Select Application"; press ENTER.

7. Use the arrow keys to select a number that does NOT match the Application ID that is configured in the DSE-45 sensor(s), and then press the ENTER key to store the new selection. (If other devices in the network are using the same Application ID number, it may be necessary to select a different number in the DSE-45).

8. Press the ESC key until the home screen is reached.

9. Repeat this procedure on other operator interface units, as desired.

Option 2.

If the operator interface is to communicate with a primary device or devices in all application groups, perform the following procedure.

[icon]	Press longer than two seconds	1.a
F6 G	⬆ or ⬇ → Control Options	1.a.2
ENTER N	⬆ or ⬇ → Application Filter	1.a.2.2

1. From the home screen of the operator interface, press and hold the SELECT (A) key for at least two seconds to obtain access to the Operator Interface Local Menus, and then press the F6 key to enter the OI Menus.

2. In the OI Menus, select "Control Options"; press ENTER.

3. Select "Application Filter"; press ENTER.

4. Select "Filter Type"; press ENTER.

5. Select "All Applications", and then press ENTER to store the change.

6. Press the ESC key until the home screen is reached.

7. Repeat this procedure on other operator interface units, as desired.

Option 3.

If the operator interface is to communicate with all of the devices in a specific application group (Application ID), perform the following procedure.

	Press longer than two seconds	1.a
F6	⬆ or ⬇ → Control Options	1.a.2
ENTER	⬆ or ⬇ → Application Filter	1.a.2.2

1. From the home screen of the operator interface, press and hold the SELECT (A) key for at least two seconds to obtain access to the Operator Interface Local Menus, and then press the F6 key to enter the OI Menus.

2. In the OI Menus, select "Control Options"; press ENTER.

3. Select "Application Filter"; press ENTER.

4. Select "Filter Type"; press ENTER.

5. Select "Selected Application", and then press ENTER to store the change.

6. Next, select "Select Application"; press ENTER.

7. Use the arrow keys to set the number to match the Application ID that is desired for this operator interface to control, and then press ENTER to store the new selection.

8. Press the ESC key until the home screen is reached.

9. Repeat this procedure on other operator interface units, as desired.

Assigning names for "All Applications" filtering

If desired, names for the DSE-45 sensors can be assigned.

ENTER	→ Configuration	1.a.7
ENTER	⬆ or ⬇ → Names	1.a.7.1
ENTER	⬆ or ⬇ → Usage	1.a.7.1.2
ENTER	⬆ or ⬇ → To edit name ⬅ or ➡ → To move cursor position	1.a.7.1.2.1

1. After filtering is properly set up and enabled, the items in the list of devices are formatted as follows: Application ID; Usage name or Application Name.

   For example: 7: Chill
   "7" is the Application ID Number
   "Chill" is either the DSE-45 Usage name or the Application Name.

   The Application ID Number determines the order in the list of devices.

2. Change the Usage name of the primary device (the device with its Sub Function set to 0) to the desired name for the application. This changes the Application Name for all devices with the same Application ID. (This can be seen in the list of devices on the "All Devices" screen when filtering is enabled).

3. If desired, the Usage name of the other drives in that application can be changed to something that describes their function in the application. (This step is not necessary when "All Applications" filtering is being used because the Usage name is not shown in the list of devices when filtering is enabled).

Assigning names for "Selected Applications" filtering

If desired, names for the devices and/or drives can be assigned.

ENTER	→ Configuration	1.a.7
ENTER	⬆ or ⬇ → Names	1.a.7.1
ENTER	⬆ or ⬇ → Usage	1.a.7.1.2
ENTER	⬆ or ⬇ → To edit name ⬅ or ➡ → To move cursor position	1.a.7.1.2.1

1. After filtering is properly setup and enabled, the items in the list of devices are formatted as follows: Application ID, Sub Function, Application Name, Drive Function (D1, D2, Gateway, etc).

   For example: 5.3: Chill.PT1
   "5" is the Application ID
   "3" is the Sub Function
   "Chill" is the Application Name
   "PT1" is the Drive Function.

   In the case of the Device with the Sub Function set to 0 (zero), the Sub Function is blank, and the Drive Function is blank.

2. Change the Usage name of the primary device (the device with its Sub Function set to 0) to the desired name for the application. This changes the Application Name for all devices with the same Application ID. (This can be seen in the list of devices on the "All Devices" screen, when filtering is enabled).
   See *Names* in the Configuration menu structure on *page 8.8.*

3. Change the Usage name of the other devices in that application to something that describes their function in the application.

   Note: Sub Function 0 must be assigned to the primary device of each application for the Application Name to show up in the list of filtered devices. If the Sub Function number of the primary device is not 0, "???" will be displayed for the Application Name in the list of Fnamedevices.

Filtered / All (F5) key

When Application Filtering is properly set up and enabled, this key is available to select the contents of the list of devices on the "All Devices" screen.

1. From the home screen, press and hold the Screen Select (A) key for at least two seconds.
2. On the "All Devices" screen, use the Filtered/All (F5) key to toggle the filtering status between "Filtered" and "All".
   - When "Filtered" is selected, only the devices that meet the application filtering requirements are displayed in the list of devices.
   - When "All" is selected, all devices found on the network are displayed in the list of devices.

Disable application filtering

To disable Application Filtering in an operator interface, perform the following procedure.

1. From the home screen, press and hold the SELECT (A) key for at least two seconds to obtain access to the Operator Interface Local Menus, and then press the F6 key to enter the OI Menus.
2. In the OI Menus, select "Control Options", and then press the ENTER key.
3. Select "Application Filter", and then press the ENTER key.
4. Select "Filter Type", and then press the ENTER key.
5. Select "All Devices", and then press the ENTER key to store the change.
6. Press the ESC key until the home screen is reached.

Maintenance

The DSE-45 can be remotely controlled via a network connection. As with any network-controlled device, when remote control of the device is implemented, there is the possibility of movement of the guiding structure when remote commands are issued. Therefore, any time personnel are near the guiding structure, it is recommended that standard safeguards be taken to prevent injury. During servicing of the equipment, to prevent injury to personnel, it is recommended that standard Lockout/Tagout procedures be used.

The DSE-45 Ultrasonic Sensor requires no scheduled maintenance. When necessary, clean the surface of the transducers using a clean, water dampened cloth. If necessary, a mild soap solution can be used to dampen the cloth.

DO NOT use chemical cleaners or solvents when cleaning the transducers, since those materials may cause damage to the transducers.

General

Input voltage range,   12 to 48 VDC nominal
at the X2 connector   10.5 to 51 VDC min/max
                                       (Customer supplied power)

Input voltage range,   12 to 24 VDC nominal
at the X3 connector   10.5 to 28 VDC min/max
                                       (Power supplied by Fife controller)

Power consumption

DSE–45–7	.225 Amps
DSE–45–11	.235 Amps
DSE–45–18	.245 Amps
DSE–45–31	.285 Amps
DSE–45–520	.335 Amps

Operating Ambient   0° to 60°C (32° to 140°F)
Temperature

Operating Humidity Range   15 to 90% Relative humidity with no condensation

Bandwidth

DSE–45–7–10	66.2 mm [2.61"]
DSE–45–11–10	107.0 mm [4.21"]
DSE–45–18–10	178.4 mm [7.02"]
DSE–45–31–10	311.0 mm [12.24"]
DSE–45–52–10	515.0 mm [20.28"]

Dimensions, excluding connectors   height x width x length in mm [inches]

DSE–45–7–10	144 x 36 x 193.2 [5.67 x 1.42 x 7.61]
DSE–45–11–10	144 x 36 x 234.0 [5.67 x 1.42 x 9.21]
DSE–45–18–10	144 x 36 x 305.0 [5.67 x 1.42 x 12.02]
DSE–45–31–10	144 x 36 x 438.0 [5.67 x 1.42 x 17.24]
DSE–45–52–10	144 x 36 x 642.0 [5.67 x 1.42 x 25.28]

Approximate weight

DSE–45–7–10	0.91 kg (2.0 lbs)
DSE–45–11–10	1.0 kg (2.2 lbs)
DSE–45–18–10	1.22 kg (2.7 lbs)
DSE–45–31–10	1.63 kg (3.6 lbs)
DSE–45–52–10	2.27 kg (5.0 lbs)

Inputs and outputs

Communication port	Ethernet based – 100 Mbps – Auto MDIX (Medium-Dependent Interface Crossover)

Sensor output (4) (2 connectors)   Maximum output +20 mA
Individually programmable   0 to 10 mA (default), 400 ohm load, maximum
0 to 20 mA (available), 125 ohm load, maximum
4 to 20 mA (available), 125 ohm load, maximum

Cable restrictions

Connection to X1, Ethernet

The Ethernet cable must be the type that includes a shield.

The Ethernet maximum drop length of 100 meters [330 feet] applies to this cable.

The minimum bend radius of the factory supplied Ethernet cable is 90 mm [3.54 inches].

Connection to X2 and X3

Maximum cable length for these cables is based on sensor size and application. Refer to drawing 227219 for maximum cable lengths.

Certifications and environmental compatibility

Product certification   –   CE

Protection class   –   IP65

Service requests and replacement parts

To request service or to get replacement parts, contact one of the following addresses:

Fife Corporation
222 West Memorial Rd.
Oklahoma City, OK, 73114, USA
Phone: 1.405.755.1600
Fax: 1.405.755.8425
Web: www.maxcessintl.com

Fife-Tidland GmbH
Max-Planck-Strasse 8
65779 Kelkheim   OR   48683 Ahaus
Deutschland   Deutschland
Telefon: +49.6195.7002.0
Fax: +49.6195.7002.933
Web: www.maxcess.eu

Siemensstrasse 13-15

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