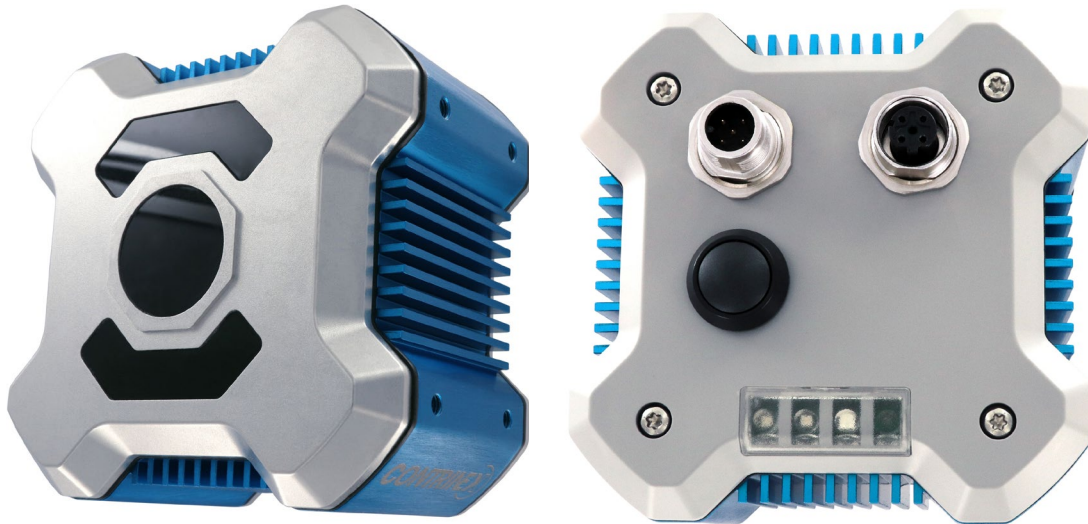


MEASUREMENT RANGE

300 -7500 mm

- ✓ Time-Of-Flight (TOF)
- ✓ Integrated lightning
- ✓ QVGA Resolution
- ✓ Integrated image processing



HM 2601

Part Number	600-100-207
Part Reference	CAM-3TIQC-C99S-SF-A



OPTICAL DATA

Technology	3D Time-of-Flight
Measurement range short range mode	300...3750 mm ¹
Measurement range long range mode	300...7500 mm ¹
Image Resolution	QVGA (320x240 px)
Angle of aperture	37° x 27.9° (Diag 46.1°)
Light source	Laser class 1, infrared 850 nm

INTERFACE

Wi-Fi access point	802.1 b/g/n 2.4GHz
Push Button	Enable local Wi-Fi network
Indicator LED's	2x multicolour + 2 color Fix
POWER Connector	Power supply, IO-Link, SIO
Ethernet Connector	Fast Ethernet (100 Mbps)
Configuration	Rest API on Wi-Fi and Ethernet

⁽¹⁾Operating range depends of the infrared reflectivity of the target object

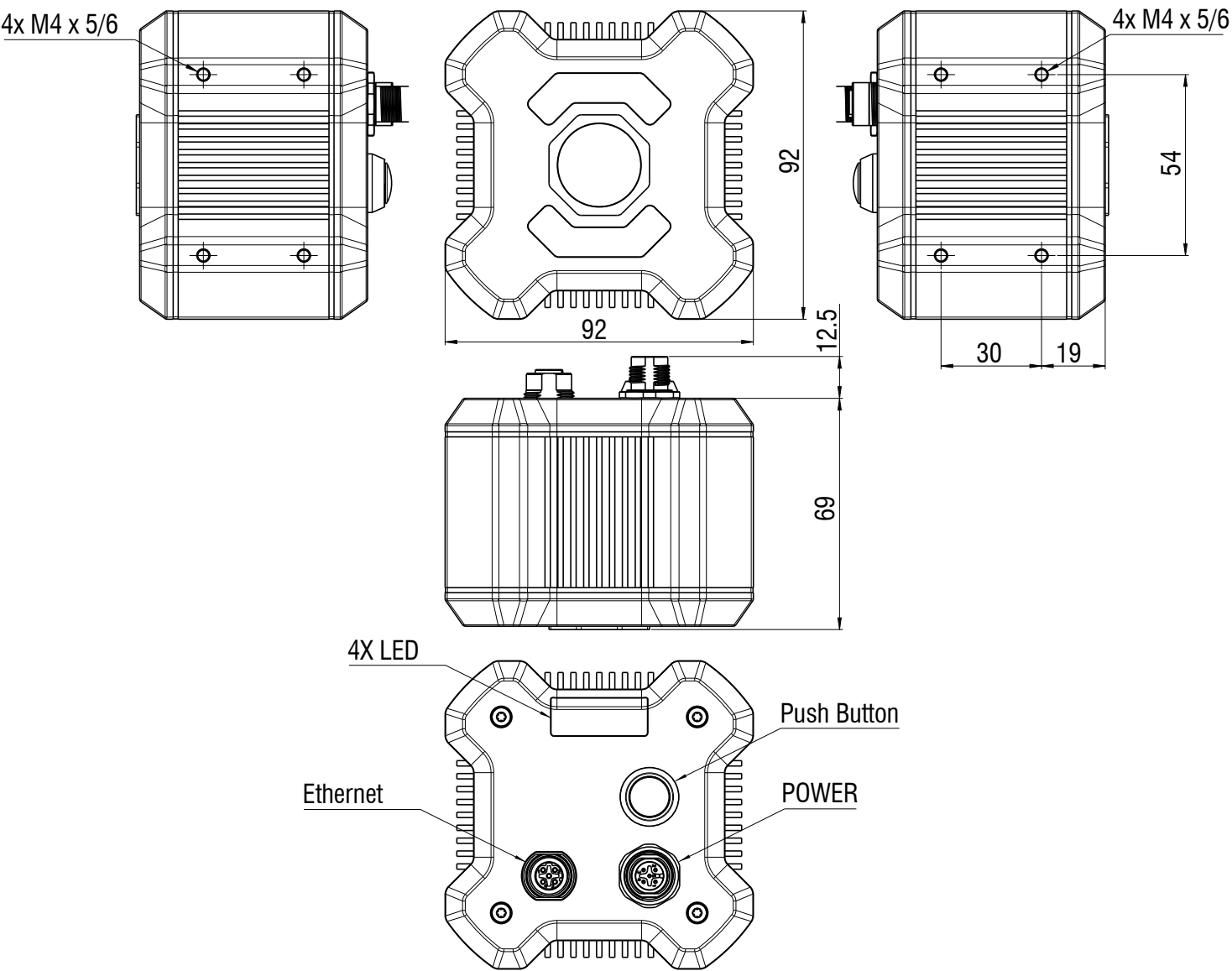
ELECTRICAL DATA

Supply voltage range (U _B)	18..30 VDC
Power Consumption (no-load)	< 1A
Number of digital outputs	2, PIN 4 & 2
Number of digital inputs	1, PIN 5 (Trigger signal)
Outputs Polarity	PNP/NPN Configurable
Outputs Current PIN 4	< 200 mA
Outputs Current PIN 2	< 600 mA
Voltage Drop Digital Outputs	< 100 VDC
Short-circuit protection	Yes
Voltage reversal protection	Yes
Max cable length	≤ 20 m

MECHANICAL DATA

Dimensions	92 x 92 x 81 mm
Enclosure rating	IP65, IP67
Ambient temperature operation	0...+50 °C
Shock and vibration	IEC 60947-5-2
Weight	470g
Housing material	Aluminium, PC, PA
Window material	PMMA
POWER connector	Male M12-5 PIN A-coded
Ethernet connector	Female M12-4 PIN D-coded
Mounting	8x M4 (4x on two opposite sides)

MECHANICAL DRAWINGS



MOUNTING CONDITIONS

Max Tightening torque	4 Nm
M4 mounting Thread length	5 mm

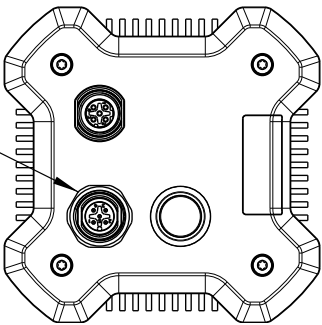
FIELD OF VIEW



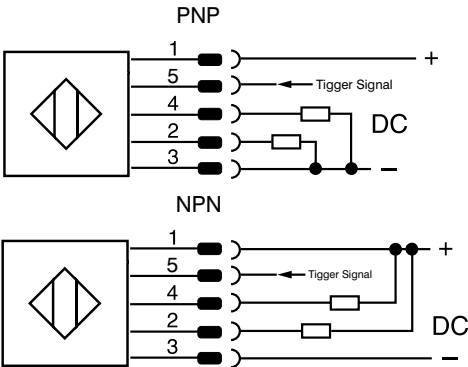
Installation Distance (m)	X (m)	Y (m)
0.5	0.33	0.25
1	0.67	0.5
2	1.34	1
3	2.01	1.51
3.5	2.34	1.76
7.5	5.02	3.76

POWER CONNECTOR

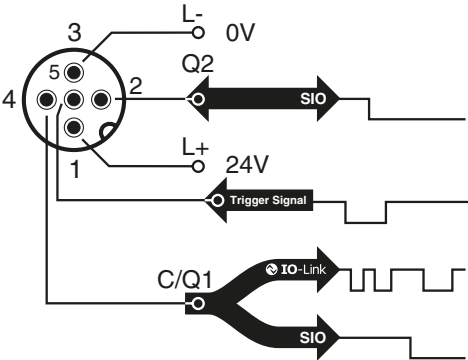
Male M12-5 PIN A-coded



WIRING DIAGRAM



PIN ASSIGNMENT



IO-LINK FUNCTIONALITIES

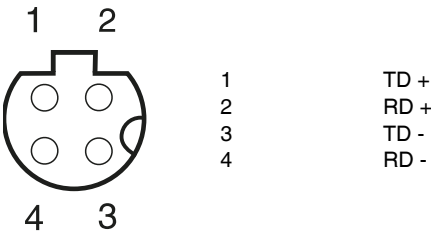
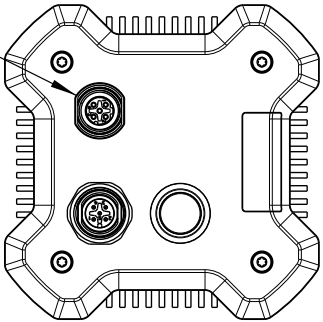
IO-LINK CHARACTERISTICS	VALUE FOR CAM-3TIQC-C99S-Sx-A
Vendor ID	342 (0156 hex)
Device ID	13762817 (D20101 hex)
IO-Link Version	1.1
Bit rate	230,4 kbit/s (COM3)
Minimum Cycle Time	8000 ms
Supports SIO Mode	YES
Supports Data Storage	YES
Supports Block Configuration	YES
Supports ISDU	YES
Process Data Input Width	32 Bytes
Process Data Output Width	16 Bytes

IODD files may be downloaded from www.contrinex.com (Download section)

ETHERNET CONNECTOR

PIN ASSIGNMENT

Female M12-4 PIN d-coded, fast Ethernet



Operators of the products we supply are responsible for compliance with measures for the protection of persons. The use of our equipment in applications where the safety of persons might be at risk is only authorized if the operator observes and implements separate, appropriate and necessary measures for the protection of persons and machines. Terms of delivery and rights to change design reserved.

CAMERA CONFIGURATION WITH SMARTVISION APP

The Contrinex Smart 3D Camera is configured using the **Contrinex SmartVision App/Software**, available for download on iOS, Android, and Windows platforms.

The camera operates using selectable **Use Cases**, which are pre-defined processing functions combining optimized 3D algorithms for specific industrial tasks. Each Use Case requires application-specific configuration by the user, including the teaching of reference scenes and the definition of evaluation parameters.

Configuration is performed through an intuitive guided workflow in the SmartVision App, allowing the user to:

- Select the appropriate Use Case for the application

- Define Regions of Interest (ROI) and thresholds
- Teach background or reference scenes
- Configure output behavior (SIO, IO-Link, REST API)
- Adjust exposure, acquisition parameters, and measurement settings
- Save and manage multiple Use Case configurations in the device

Up to **64 Use Cases** can be stored in the device, **with one active Use Case at a time**.

For detailed configuration and commissioning instructions, refer to the Operating Manual.

AVAILABLE USE CASES

The Contrinex Smart 3D Camera provides three embedded Use Cases that execute 3D data processing directly on the device. Each Use Case applies optimized algorithms for a specific industrial task and delivers results via SIO, IO-Link, or Ethernet (REST API).

Only **one Use Case** at a time can be linked to the SIO outputs/IO-Link; up to **64 Use Cases** can be stored in the device.

The Selection of the active use case can be performed through the SmartVision app, the IO-Link process data outputs or the Rest API over Ethernet.

DISTANCE MEASUREMENT

3D distance evaluation within user-defined Regions of Interest (ROI).

Functionality

- Measures absolute distance values (Average, Max, Min)
- Measurement relative to background or camera origin
- Up to 64 configurable ROIs
- Output via IO-Link Process Data or REST API

Typical values

Target Object surface: 200 x 200 mm

Target Reflectivity: 18%

Operating Distance in m	Repeatability mm
0.3 ..3	5
3..5	15
5..7.5	30

OBJECT SIZING

Functionality

Measures:

- Longest side (X)
- Smallest side (Y)
- Average Height (Z)
- Max height (Max Z)
- Angle (°), From Image horizontal

Data output via IO-Link Process Data, or REST API

Limitation:

- Full object within the field of view
- Flat Background
- Static target object
- Minimum Object size: 100 x 100 x 100 mm
- Operating range 0.3 to 3.75 m

Typical values

Target Object surface: 200 x 200 mm

Target Reflectivity: 18%

Exposure time: 8 ms

Background Distance: 1m

Metric	Performance
Repeatability (L, W, H)	5 mm
Accuracy (Length, Width)	± 25 mm
Accuracy Height (flat object	± 25 mm

COMPLETENESS CHECK

Verification of the presence of all required items in **compartmentalized packaging** (trays, blister packs, kitting boxes, sorting grids, etc.). This Use Case is designed for applications where **all inspected objects are identical in shape and dimensions**.

Functionality

- Detects whether each compartment contains an object
- Confirms the presence of uniform, identical items across all compartments
- Identifies missing, misplaced, or incorrectly seated items
- Evaluates completeness of multi-slot packaging in a single acquisition
- Provides a Boolean pass/fail output
- Results available via SIO, IO-Link Process Data, or REST API
- Ideal for kitting, blister packaging, multi-slot assembly trays, and order verification

Limitations

- All inspected objects must be identical (size, shape, and overall geometry)
- Compartments must be fully visible in the camera's field of view
- Transparent or highly reflective tray materials may affect stability
- Very dark or low-reflective objects can reduce detection reliability
- Excessive packaging tilt may distort compartment geometry

Typical Target object requirements:

Distance to object 1m.

- Maximum target object speed: 0.2ms
- Minimum container height for automatic alignment: 30 mm
- Maximum angular variation*: $\pm 45^\circ$
- Minimum detectable item size inside packaging compartments: 20 × 20 × 60 mm

*Angular deviation relative to the taught reference image (2D plane).

IO-LINK PROCESS DATA REPRESENTATION

PROCESS DATA INPUT

BITOFFSET

Byte	7	6	5	4	3	2	1	0
31		Error	Ethernet	WI-FI	Trigger	Ready	Output 2	Output 1
30	Running Config ID (0 to 255)							
29	Bool 8	Bool 7	Bool 6	Bool 5	Bool 4	Bool 3	Bool 2	Bool 1
28	Bool 16	Bool 15	Bool 14	Bool 13	Bool 12	Bool 11	Bool 10	Bool 9
27	Measurement value 1							
26								
25	Measurement value 2							
24								
23	Measurement value 3							
22								
21	Measurement value 4							
20								
19	Measurement value 5							
18								
17	Measurement value 6							
16								
15	Measurement value 7							
14								
13	Measurement value 8							
12								
11	Measurement value 9							
10								
9	Measurement value 10							
8								
7	Measurement value 11							
6								
5	Measurement value 12							
4								
3	Measurement value 13							
2								
1	Measurement value 14							
0								

Output 1	0 : Output 1 Signal is ON 1 : Output 1 Signal is OFF
Output 2	0 : Output 2 Signal is ON 1 : Output 2 Signal is OFF
Ready	0 : Image Acquisition or treatment is ongoing 1 : Camera is ready for new acquisition
Trigger	0 : Physical Input trigger signal is OFF 1 : Physical Input trigger signal is ON
WI-FI	0: Local WI-FI network is turned OFF 1: Local WI-FI network is turned ON
Ethernet	0 : no Ethernet link signal detected 1 : Ethernet link signal detected
Error	0 : Camera has no error 1 : Camera has error
Running Config ID	0 to 63 : ID of active configuration in the camera 255 : Selected Configuration ID does not exist
Bool 1-16	0: Boolean Result of Configuration is False 1: Boolean Result of active configuration is TRUE

IO-LINK PROCESS DATA REPRESENTATION

PROCESS DATA OUTPUT

BITOFFSET

	7	6	5	4	3	2	1	0
15	RFU							Trigger
14	Running Config ID (0 to 255)							
13..0	RFU							
	Trigger	0 : NO new Image aquisition is requested 1: New Image aquisiton is requested						
	Running Configuration ID	0 to 63 : Selection ID of active configuration in the camera 64 to 255 : Not available for selection (Generates Error)						
	RFU	Reserved for future use						

IO-LINK SERVICE DATA

PARAMETER NAME	INDEX		SUB INDEX		SIZE (BYTES)	ACCES	DATA TYPE	DATA STORAGE	DEFAULT VALUE	RANGE
	dec	hex	dec	hex						
DIRECT PARAMETER										
Master-Command	0	0x00	1	0x01	1	W	uint8		-	-
MasterCycle-Time			2	0x02	1	R/W	uint8		0x44 (8ms)	-
MinCycleTime			3	0x03	1	R	uint8		0x44 (8ms)	-
M-Sequence-Capability			4	0x04	1	R	uint8		0x39	-
Revision ID			5	0x05	1	R	uint8		0x11	-
ProcessDataIn			6	0x06	1	R	uint8		0xDF	-
ProcessDataOut			7	0x07	1	R	uint8		0x8F	-
VendorID 1			8	0x08	1	R	uint8		0x01	-
VendorID 2			9	0x09	1	R	uint8		0x56	-
DeviceID 1			10	0x0A	1	R	uint8		0xD2	-
DeviceID 2			11	0x0b	1	R	uint8		0x01	-
DeviceID 3			12	0x0c	1	R	uint8		0x01	-
SYSTEM COMMAND										
System_command	2	0x02			1	W	uint8		-	0x81 Application Reset (Mandatory) 0x83 Back-To-Box (Mandatory)
DATA STORAGE										
DS_Command	3	0x03	1	0x01	1	R/W	uint8		-	0x00: Reserved 0x01: DS_UploadStart 0x02: DS_UploadEnd 0x03: DS_DownloadStart 0x04: DS_DownloadEnd 0x05: DS_Break 0x06 to 0xFF: Reserved
State_Property			2	0x02	1	R	uint8		-	Bit 0: Reserved Bit 1 and 2: State of Data Storage 0b00: Inactive 0b01: Upload 0b10: Download 0b11: Data Storage locked Bit 3 to 6: Reserved Bit 7: DS_UPLOAD_FLAG ""1"" : DS_UPLOAD_REQ pending ""0"" : no DS_UPLOAD_REQ
Data_Storage_Size			3	0x03	4	R	uint32		0x70	0 - 0x0800
Parameter_Checksum			4	0x04	4	R	uint32		-	-
Index_List			5	0x05	11	R	array (of octetstr3)		00 18 00 00 19 00 00 1A 00 00 00	-
PROFILE PARAMETER										
Profile Characteristic	13	0x0D			2	R	array (uint16)		0x4000	-

IO-LINK SERVICE DATA										
PARAMETER NAME	INDEX		SUB INDEX		SIZE (BYTES)	ACCES	DATA TYPE	DATA STORAGE	DEFAULT VALUE	RANGE
	dec	hex	dec	hex						
PD DESCRIPTOR										
PD Input Descriptor	14	0x0E			51	R	1 x array (octetstr3)		01 08 00 02 08 08 01 10 10 01 10 20 01 10 30 01 10 40 01 10 50 01 10 60 01 10 70 01 10 80 01 10 90 01 10 A0 01 10 B0 01 10 C0 01 10 D0 01 10 E0 01 10 F0	-
PD Output Descriptor	15	0x0F			15	R	1 x array (octetstr3)		01 01 00 02 07 01 02 08 08 02 10 10 02 40 40	-
FUNCTION CLASS IDENTIFICATION (0X8000)										
Vendor Name	16	0x10			16	R	char[16]		Contrinex AG	-
Vendor Text	17	0x11			32	R	char[32]		www.contrinex.com	-
Product Name	18	0x12			32	R	char[32]		CAM-3TIQC-C99S-xx-A	-
Product ID	19	0x13			16	R	char[16]		xxx-xxx-xxx	-
Product Text	20	0x14			32	R	char[32]		ToF Camera	-
Serial Number	21	0x15			16	R	char[16]		123456	-
Hardware Revision	22	0x16			16	R	char[16]			-
Firmware Revision	23	0x17			16	R	char[16]			-
Application Specific Tag	24	0x18			32	R/W	char[32]	YES	***	<user string, 32 bytes (variable length)>
FUNCTION & LOCATION TAG										
Function Tag	25	0x19			32	R/W	char[32]	YES	***	<user string, 32 bytes (variable length)>
Location Tag	26	0x1A			32	R/W	char[32]	YES	***	<user string, 32 bytes (variable length)>
FUNCTION CLASS DIAGNOSIS (0X8003)										
Device Status	36	0x24			1	R	uint8		0= device is OK, 1= Maintenance required, 2= out of specification, 3= Functional check, 4= Failure, 5...255 reserved	0 - 4
Detailed Device Status	37	0x25			9	R	array (of octetstr3)		00 00 00 00 00 00 00 00 00	

IO-LINK SERVICE DATA

PARAMETER NAME	INDEX		SUB INDEX		SIZE (BYTES)	ACCES	DATA TYPE	DATA STORAGE	DEFAULT VALUE	RANGE
	dec	hex	dec	hex						
RUNNING USE CASE PARAMETER										
Acquisition mode	64	0x40	1	0x01	1	R	uint8		0	0 = Continous Mode 1 = Trigger mode 255 = Usecase not present
Running Use case name			2	0x02	1	R	uint8		0	0 = Multi Distance Measurement 1 = Defect Detection 2 = Level measurement 3 = Completeness check 4 = Object sizing 5 = Position control 255 = Usecase not present
Number of loaded Use cases			3	0x03	1	R	uint8		0	0 to 64
CAMERA PARAMETERS										
Camera HW state	65	0x41	1	0x01	1	R	uint8		0	0 = Running 1 = Error
Image Exposure time			2	0x02	2	R	uint16		8000	0 to 65535 us
HDR Mode			3	0x03	1	R	uint8		0	0 = Deactivated 1 = Enabled
HDR exposure time			4	0x04	2	R	uint16		0	0 to 65535 us
Range			5	0x05	1	R	uint8		0	0 = Short range mode 1= Long range mode
CAMERA MONITORING UNIT										
Interface board temp	66	0x42	1	0x01	2	R	int16		N/A	0 to 150
Min interface board temp			2	0x02	2	R	int16		N/A	0 to 150
Max Interface board temp			3	0x03	2	R	int16		N/A	0 to 150
IR board temp			4	0x04	2	R	int16		N/A	0 to 150
Min IR board temp			5	0x05	2	R	int16		N/A	0 to 150
Max IR board temp			6	0x06	2	R	int16		N/A	0 to 150
CPU temperature			7	0x07	2	R	int16		N/A	0 to 150
Min CPU temperature			8	0x08	2	R	int16		N/A	0 to 150
Max CPU temperature			9	0x09	2	R	int16		N/A	0 to 150
Lifetime Operating Hours			10	0x10	4	R	int16		N/A	0 to 150
Lifetime poweron cycle			11	0x11	4	R	int16		N/A	0 to 150
OSS										
Pin Polarity	67	0x43	1	0x01	1	R	uint8		0	0 = PNP 1 = NPN
OSS1 Output pin Direction			2	0x02	1	R	uint8		0	0= SIO Output/ IO-link
OSS2 Output pin Direction			3	0x03	1	R	uint8		0	0 =SIO Output
OSS3 Output Pin Direction			4	0x04	1	R	uint8		0	1 = Input Trigger
OSS1 Logic			5	0x05	1	R	uint8		0	0= NO 1 = NC 255 = No output
OSS2 Logic			6	0x06	1	R	uint8		0	0= NO 1 = NC 255 = No output
OSS3 Logic			7	0x07	1	R	uint8		0	0 = Input Trigger

IO-LINK SERVICE DATA

PARAMETER NAME	INDEX		SUB INDEX		SIZE (BYTES)	ACCES	DATA TYPE	DATA STORAGE	DEFAULT VALUE	RANGE
	dec	hex	dec	hex						
NETWORK SETTINGS										
IP address	68	0x44	1	0x01	16	R	char[16]		192.168.0.10	N/A
Subnet mask			2	0x02	16	R	char[16]		255.255.255.0	N/A
Gateway IP			3	0x03	16	R	char[16]		0.0.0.0	N/A
DHCP Enabled			4	0x04	1	R	uint8		0	0 = No 1 = Yes 255 = N/A
Mac Address			5	0x05	16	R	char[16]		xx:xx:xx:xx:xx:xx	N/A

IO-LINK ERROR				
Error Code		Error Type	Description	
DEC	HEX			
32785	8011	Index Not Available	The addressed Index is not implemented in the device or cannot be accessed in the current device state.	
32786	8012	Subindex Not Available	The addressed Subindex does not exist for the chosen Index or cannot be accessed in the current device state.	
32803	8023	Access Denied	The requested access is not permitted. Possible reasons include: write protection active, insufficient access level, or the parameter is locked by the device state.	
32816	8030	Parameter Value Out of Range	The written parameter value is outside the permitted range defined by the device.	
32819	8033	Parameter Length Overrun	The transferred data block contains more bytes than expected for the selected Index/Subindex	
32820	8034	Parameter Length Underrun	The transferred data block contains fewer bytes than expected for the selected Index/Subindex.	
32821	8035	Function Not Available	The requested function or command is not supported by the device, or is not available in the current operating state.	

IO-LINK EVENTS					
Error Code		Event Type	Device Status	Event Description	Corrective Action
DEC	HEX				