

LAND EDGED RED HOLLINGWORTH ROAD,
LITTLEBOROUGH, ROCHDALE

FOUL WATER PUMPING STATION DESIGN SPECIFICATION

DESIGN AND CONSTRUCTION GUIDANCE AS AMENDED BY THE UNITED
UTILITIES ADDENDUM

ISSUE 1.0 – 8TH JUNE 2023

APS INTERNAL REFERENCE: APS 5533

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Revision	Purpose description	Originated	Approved	Date
Issue 1.0	For Approval	GR	CW	08/06/2023

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1.0 PROJECT DESIGN

1.1 INTRODUCTION

The proposed foul water pumping station has been designed in accordance with Design and Construction Guidance as amended by the UU Addendum, and includes for the installation of all stated components within the inlet chamber, pump chamber and valve chamber as per the accompanying drawings. The pumping station is serving 100 residential dwellings. The total peak incoming flow is 4.63 l/s, and this equates to a total emergency storage requirement of 16,000 litres. This storage will be achieved in a combination of the upstream network, the Inlet Chamber and the Wet Well above high level alarm and below the top storage level as per DCG guidelines. APS have estimated a top storage level of 148.711mAOD based on the latest drainage drawing provided, actual level to be confirmed by the consultant. The pumping station is designed as a Type 3 station.

1.2 PUMP STATION DESIGN DATA

Liquid Handled:	Sewage
Design Flow:	4.7 l/sec
Total Number of Dwellings:	100
Total Peak Incoming Flow:	4.63 l/sec
Total Storage Requirement:	16.0 m ³
Cover Level:	152.000 m
Pump Chamber Inlet Invert Level:	145.560 m
Storage Invert Level:	148.711 m
Chamber Base Level:	144.600 m
Pump Outlet Invert Level:	150.860 m
Rising Main Discharge Invert:	158.550 m

1.3 PUMP CHAMBER DESIGN DETAIL

Chamber Construction:	PCC Rings
Chamber Diameter:	2.1 m
Chamber Length/Depth:	7.4 m
Inlet Diameter:	150 mm
Pipework Size:	80 mm
Pipework Termination Size:	80 mm
Pipework Material:	Ductile Iron

1.4 INLET CHAMBER DESIGN DETAIL

Cover Level:	152.000	m
Inlet Invert Level:	145.912	m
Chamber Base Level:	145.710	m
Outlet Invert Level:	145.810	m
Chamber Construction:	PCC Rings	
Chamber Diameter:	1500	mm
Chamber Depth:	6290	mm
Access Cover Size:	675 x 675	mm
Penstock Required:	Yes	
Over Pumping Required:	No	

1.5 VALVE CHAMBER DESIGN DETAIL

Cover Level:	152.000	m
Inlet Invert Level:	150.860	m
Chamber Base Level:	150.500	m
Outlet Invert Level:	150.860	m
Chamber Construction:	PCC Chamber	
Chamber Dimensions:	2400 x 1800	mm
Chamber Depth:	1500	mm
Access Cover Size:	2400 x 1800	mm
Gate Valve Size:	80	mm
Non-Return Valve Size:	80	mm
Valve Material:	Ductile Iron	
Over Pumping Required:	Yes	

1.6 PUMP DESIGN DETAIL

APS carried out pump selections using 3 Pump Manufacturers, (Xylem, Sulzer, Grundfos), in order to demonstrate due diligence in selecting the most suitable pump for the project. Details of each pump selection can be found within Appendix A.

	Kw Rating	Rated Speed (rpm)	Max Particle Size (mm)	Flow Rate at Duty Point (l/s)	Flow Rate at pump B.E.P. (l/s)	Duty Flow as a % of Flow rate at B.E.P.
Grundfos	4.0	2930	80	5.32	10.50	50.67
Xylem	2.4	2870	100	4.84	11.39	42.49
Sulzer	4.0	2900	50	5.34	12.70	42.02

From the 3 selections, the Grundfos pump was preferred and has been chosen to progress the design. Reasons for selection are: duty flow rate and max particle size are all within an acceptable range and the pump demonstrates the most efficient selection based upon the design flow as a % of the flow at pump B.E.P.

No. Of Pumps:	2
Pump Operation:	Duty/Standby
Discharge Rate Per Pump:	5.32 l/sec
Static Head:	13.40 m
Total Head Generated:	18.72 m
Pump Type:	Grundfos
Pump Model:	SLV.80.80 .40.2.51D.C
Motor Housing:	Cast Iron
Motor Shaft:	Cast Iron
Solids Handling:	80 mm
Explosion Proof:	No
Motor Rating:	4.0 kW
Power Supply:	400 V
Phase:	Three
Method of Starting:	Star/delta
Cable Length:	20 m
Guide Rail Size:	2.0 "
Guide Rail Material:	Stainless Steel
Discharge Connection Size:	80 mm

1.7 PUMP LEVEL DATA

Pump Stop Level:	144.950	m
Duty Pump Start Level:	145.350	m
Standby Pump Start Level:	145.500	m
High Level Alarm:	145.650	m
Duty Point Level:	145.150	m

1.8 CONTROL PANEL DESIGN DETAIL

Control Panel Type:	UU DCG Edition
Panel Form:	Form 4
Level Control:	Ultrasonic
Level Control Code:	XRS5
Backup Level Control:	Floats

1.9 RISING MAIN DESIGN DETAIL

Length:	400	m
Outside Diameter:	110	mm
Inside Diameter:	89.1	mm
SDR Rating:	11	
Velocity:	0.853	m/sec
Highest Point on Rising Main:	158.840	m
Air Release Valves Required:	NO	
Washout Chambers Required:	NO	

The specific route and profile of the rising main has been designed by others and details of this have been provided under separate cover.

For rising mains longer than 500m DCG advise that a Hydraulic Analysis is undertaken. As the rising main is approximately 400m this will not be required.

2.0 PROJECT CALCULATIONS

2.1 RISING MAIN SEPTICITY CALCULATIONS

Rising Main Volume:	2.494	m ³
Sump Volume:	1.161	m ³
Discharge Flow:	5.320	l/s
DWF @ Full Build & Occupancy:	0.493	l/s

Full Build

Accumulating time in Wet Well:	2354	seconds
Pump Cycle Time:	218	seconds
Volume in 1 Cycle:	1.269	m ³
No of Cycles:	2	
Retention time:	86	minutes

Half Build

DWF @ Half Build & Occupancy:	0.247	l/s
Accumulating time in Wet Well:	4708	seconds
Pump Cycle Time:	218	seconds
Volume in 1 Cycle:	1.215	m ³
No of Cycles:	3	
Retention time:	246	minutes

Fraction Build (34 Dwellings)

DWF @ 34 Dwellings Occupied:	0.168	l/s
Accumulating time in Wet Well:	6924	seconds
Pump Cycle Time:	218	seconds
Volume in 1 Cycle	1.198	m ³
No of Cycles	3	
Retention time	357	minutes

The above calculations show that septicity is not a problem once a DWF of 0.168 l/s is achieved, which is the point at which 34 dwellings are occupied. There is no risk of septicity at either full or half occupancy as the retention time at both points is less than the maximum of 6 hours as outlined in DCG.

2.2 STORAGE CALCULATIONS

The storage calculations for this project have been carried out by APS, based on information provided by Eastwood & Partners Ltd and Countryside Partnership (Yorkshire). APS have estimated a top storage level of 148.711mAOD. The total storage requirement for the Residential development has been calculated following Design and Construction Guidance of 160 litres per dwelling. Please see the below breakdown.

Total number of Dwellings:	100
Total Emergency Storage required: $160 \times 100 =$	<u>16,000 litres</u>
Wet Well Storage Capacity:	10,603 litres
Inlet Chamber Storage Capacity:	5,304 litres
Upstream Network Storage Capacity:	2,844 litres
Total Available Storage Capacity:	<u>18,751 litres</u>

2.3 HYDRAULIC DESIGN

The design flow rate for foul pumping stations should be at least the maximum of half the peak incoming flow rate and the flow rate required to achieve a minimum flow velocity in the rising main.

Total Peak Flow Rate:	4.63	l/sec
Minimum Design Flow Rate:	2.32	l/sec
Minimum Flow Rate for RM Cleansing:	4.68	l/sec
Pump Design Flow Rate:	4.70	l/sec

2.4 SUMP VOLUME CALCULATIONS

The pump operating volume (volume between pump stop and pump start) to be designed to allow minimum retention and limit the number of starts to 10 per hour. The maximum number of starts occurs when the incoming flow is half the pumped discharge rate.

Discharge Flow Rate:	5.32	l/sec
Incoming Flow:	4.63	l/sec
Starts Per Hour:	10	/hour

Sump Volume Required:	$\frac{360 \times \frac{5.32}{2}}{2 \times 1000}$	478.8 litres
		0.479 m ³
Pump Stop Level:	144.950	m
Duty Pump Start Level:	145.350	m
Distance Between:	400	mm
Sump Diameter:	2100	mm
Gross Sump Volume:	1,385	litres
	1.385	m ³
Benching to Subtract*:	0.224	m ³
Net Sump Volume:	1.161	m ³

*Benching volume calculated using 3D CAD software.

2.5 CONTROLS PHILOSOPHY

The pumping system is a dual submersible station fitted with pumps of identical construction and performance, operating on a duty standby regime with an auto change over after every cycle, to give equal operating duty times.

Within in the ICA section a Xylem ICA Pump controller is installed [type APP741 with built in UU programme TeMacs & WITS communication capabilities], thus removing the need for a separate telemetry outstation. All functions, alarms and off-site interrogation are available remotely via the APP741 controller.

Level control is by an Ultrasonic transducer (Siemens LUT420) supported with a separate level float switch for high level and backup activation wired back to the ICA control panel.

Should abnormal operation occur such as loss of ultrasonic echo, APP failure or high level, simultaneously an alarm signal will be generated to the telemetry in the APP 741 unit, and the system will operate under back up control from the hard-wired float switch operating the pumps on a duty standby programme.

Upon receipt of any abnormal operation failure, a state of readiness will be initiated in the back up control system. The pumps will only operate when the high-level float is active. The back up control will then take over pumping operations until the abnormal issues are resolved. Under backup control, the pumps will operate for a fixed time when the high-level float is reached. This time is set at an external timer relay in the ICA compartment.

In the event high level is reached without any operational failure, back up control will not be initiated, but a high-level alarm will be sent out via the APP 741.

The APP 741 constantly monitors level, and via a configured timer the duty pump can run for a fixed time as per the APP programme. This facility is available when all is healthy and level are between stop and start.

Our design negates the requirement for a stop circuit as per U.U safe systems of work, appertaining to the safe isolation systems required to remove pumps or to enter wet well for maintenance and cleaning.

Generator Earthing arrangements are provided via a copper electrode driven into the ground adjacent to the kiosk, a concrete inspection chamber and interconnecting cable to the panel.

The design of the control panel is a standard template as agreed with United Utilities, and is fully conforming to the Design and Construction Guidance as amended by the UU addendum.

APPENDIX A.

ATEX RISK ASSESSMENT

	Risk Factor	Y/N	Evaluation & Comment
1	Is the catchment area solely domestic premises?	Yes	Domestic dwellings are low risk as any potentially methane generating waste is diluted with grey water and rainfall. All domestic dwellings have high level vents from sewer pipes.
2	Are fuel filling stations located within the catchment area?	No	Filling stations bring with them the risk of deliver tankers losing containment to drains.
3	Are the fuel filling stations independent?	No	Large chain fillings stations such as BP are assumed to be low risk due to their compliance with APEA Book.
4	Is there >1 independent fuel filling station located within the catchment area?	No	Multiple fillings stations increases the risk due to number of road tanker movements and possible loss of containment following an incident.
5	Are there industrial premises located with the catchment area?	No	- If the criteria specified are met then a stage 2 RA is required. - Ensure each premise is evaluated individually with relation to the records made public by the EA & HSE.
5a	Does the premise's trade effluent certificate specify any risks relating to discharge of flammable effluent?	No	Trade effluent certificates can be accessed through TEMS (Trade Effluent Management System).
5b	Does the quantity of road tank deliveries to the premise of flammable materials pose significant risk?	No	- The scale of the chemical or petroleum works should be considered, in terms of quantity of deliveries in addition to the inventories already present on site. - Emphasis here should be placed on the <i>quantity</i> of deliveries, with how this is directly related to increased risk of loss of containment following and incident.
5c	Does the premise have bulk storage of flammable liquids on site?	No	- Examples of these are storage tanks, IBC's and 250 litre drums. - This includes deliveries of flammable liquids in tankers or wagons.
5d	Is there bulk storage of LPG, requiring road tanker delivery, at the premise?	No	Solely LPG cylinder storage, with no delivery, is classified as low risk.
6	Are catchment pipelines or boreholes routed or drilled through rock formations likely to contain methane?	No	- For further information relating to the risk associated with ground methane, see both the supporting document and [1]. - Shale rock formations, historical mine workings or landfill sites should be considered for methane risk.

Result	Stage 1 Risk Assessment Acceptable
Additional Advisories	No Specific Additional Advisories

[1] United Utilities, "Risk Assessment Criteria for Catchment Analysis - Appendix B".

Name & Title: Sam Buswell Engineering Manager

Company: Countryside Partnerships

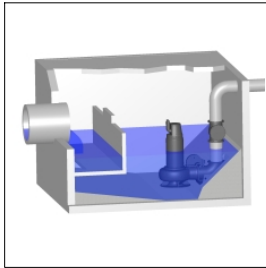
Company Address: Red Hall Avenue, Wakefield, WF1 2UL

Date: 7/6/2023

Signed: [Signature]

APPENDIX B.

FRICTION LOSS CALCULATIONS AND PUMP CURVES



Friction loss calculation

Pumped fluid Water, pure	Static head 13.4	Layout Wet well installation
Flow 4.7 l/s	Number of pumps 1	Calculation model Colebrook-White
Viscosity 1.569 mm ² /s	Nature of system Single head pump	

Type	Ø (mm)	? or L	Qty.	v (m/s)	k (mm)	ΔH (m)
------	-----------	--------	------	------------	-----------	-----------

Ø = Diameter v = Velocity k = Pipe roughness ΔH = Head loss

Common discharge side pipe - GB / Cast iron CLind / DN 80 (80) / K factor for Wastewater acc. DWA-A110

Pipe length	77	13 m	1	1.009	0.25	0.2551
Discharge Connection	77	0.3	1	1.009		0.01558
Elbows	77	0.6	2	1.009		0.03115
Non-return valves	77	0.9	1	1.009		0.04673
T-piece	77	0.8	2	1.009		0.04154
Valve	77	0.3	1	1.009		0.01558
Total friction head						0.4057

Common discharge side pipe - GB / HPPE (PE100) SDR11 / DN 110 (110) / K factor for Wastewater acc. DWA-A110

Pipe length	89.1	400 m	1	0.7538	0.25	3.716
Outlet	89.1	1	1	0.7538		0.02896
Total friction head						3.745
Friction loss head						4.151 m
Total static head						13.4 m
Total head						17.55 m

Project	Created by	Garryson Robles	Last update	6/8/2023
Block	Created on	6/8/2023		

Qty.	Description
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1	SLV.80.80 .40.2.51D.C
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Note! Product picture may differ from actual product

Product No.: [98626039](#)

Non-self-priming, single-stage, centrifugal pump designed for handling wastewater, process water and unscreened raw sewage.

The pump is designed for intermittent and continuous operations in submerged installation. The efficient SuperVortex impeller provides passage of long fibres and solids up to 80 mm and is suitable for wastewater with a dry matter content of up to 5 %. A unique stainless-steel clamp assembling system enables quick and easy disassembly of the pump from the motor unit for service and inspection. No special tools are required. Pipework connection is via a DIN flange.

Controls:

Moisture sensor: with moisture sensors

Water-in-oil sensor: without water-in-oil sensor

Liquid:

Pumped liquid: Any Newtonian liquid

Liquid temperature range: 10 .. 40 °C

Selected liquid temperature: 20 °C

Density: 998.2 kg/m³

Technical:

Actual calculated flow: 5.32 l/s

Maximum flow: 22.2 l/s

Resulting head of the pump: 18.72 m

Type of impeller: SUPER VORTEX

Maximum particle size: 80 mm

Primary shaft seal: SIC/SIC

Approvals: CE EN12050-1

Curve tolerance: ISO9906:2012 3B2

Rated speed: 2930 rpm

Materials:

Pump housing: Cast iron
EN 5.1301 EN-GJL-250

Impeller: Cast iron
EN 5.1301 EN-GJL-250

Motor: EN-GJL-250

Installation:

Range of ambient temperature: 0 .. 40 °C

Maximum operating pressure: 6 bar

Flange standard: DIN

Type of inlet connection: DIN

Type of outlet connection: DIN

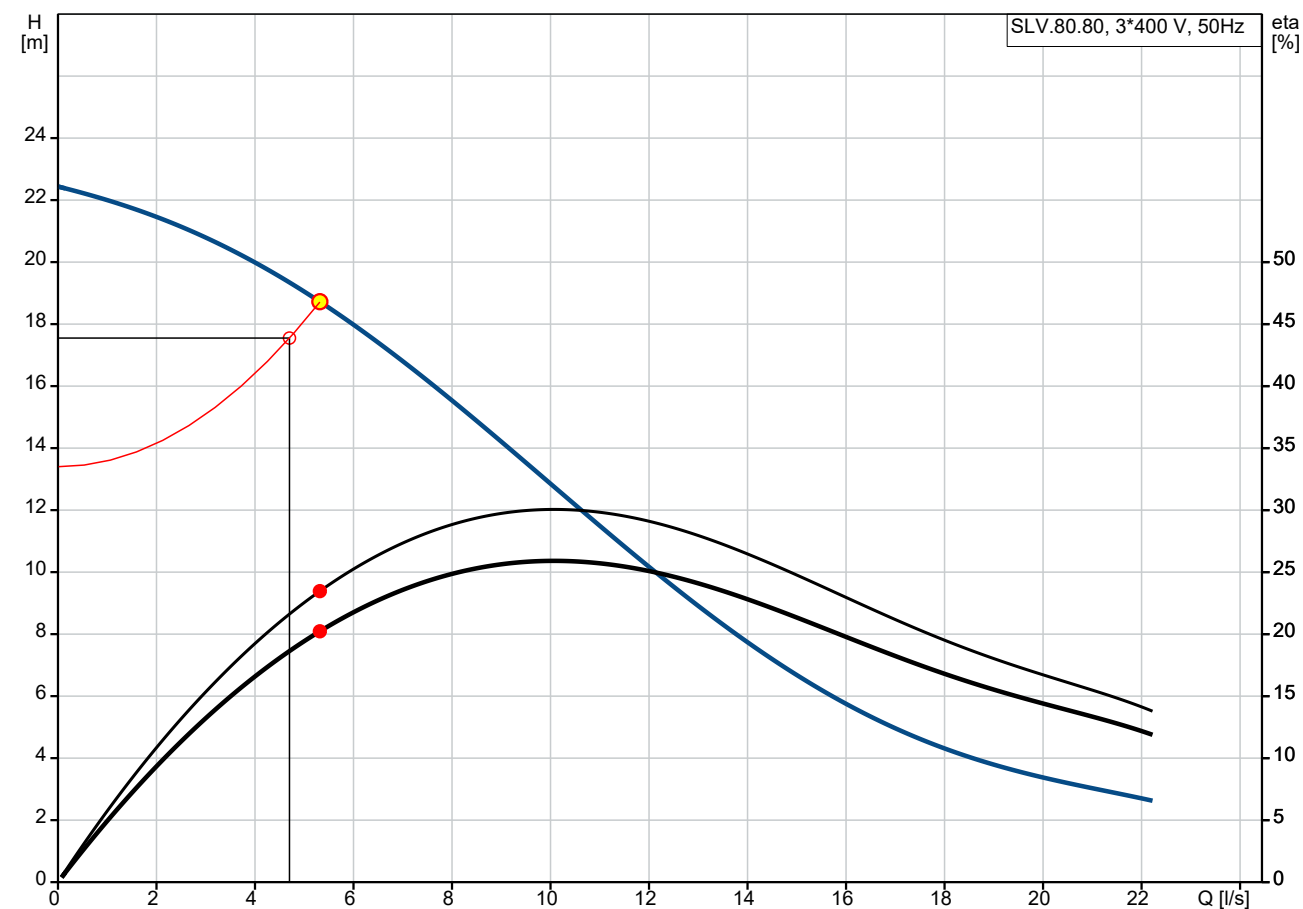
Size of inlet connection: DN 80

Size of outlet connection: DN 80

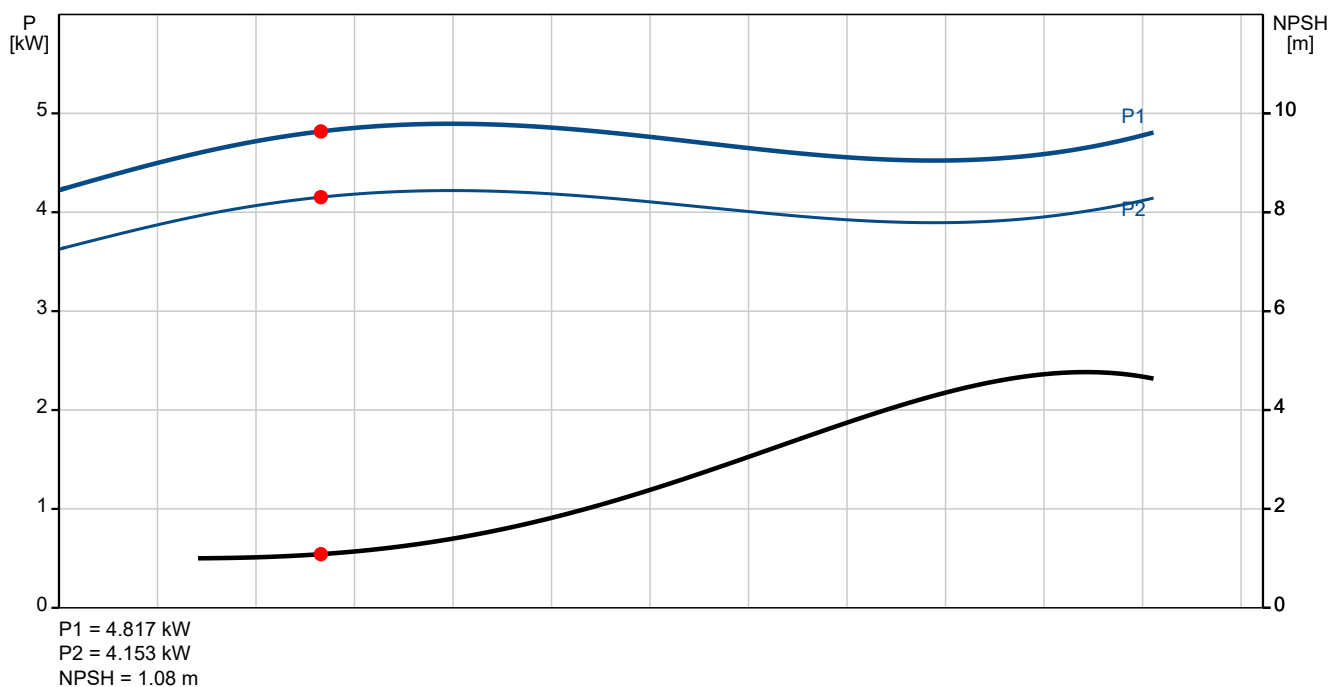
Pressure rating: PN 10

Qty.	Description
1	Maximum installation depth: 20 m Auto-coupling: 96090993 Frame range: C22 Electrical data: Power input - P1: 4.9 kW Rated power - P2: 4 kW Mains frequency: 50 Hz Rated voltage: 3 x 380-415 V Voltage tolerance: +10/-10 % Max starts per hour: 20 Rated current: 8.2 A Starting current: 86 A Cos phi - power factor: 0.88 Cos phi - p.f. at 3/4 load: 0.83 Cos phi - p.f. at 1/2 load: 0.77 Rated speed: 2930 rpm Motor efficiency at full load: 86.2 % Motor efficiency at 3/4 load: 85.3 % Motor efficiency at 1/2 load: 83.2 % Number of poles: 2 Start. method: star/delta Enclosure class (IEC 34-5): IP68 Insulation class (IEC 85): H Explosion proof: no Cable type: LYNIFLEX Length of power cable: 10 m Others: Net weight: 121 kg Danish VVS No.: 391299224 Finnish LVI No.: 4836121 Country of origin: HU Custom tariff no.: 84137021

98626039 SLV.80.80 .40.2.51D.C 50 Hz

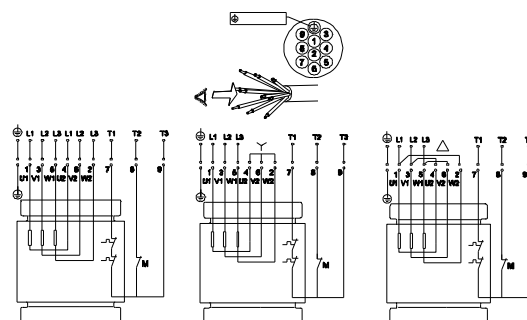
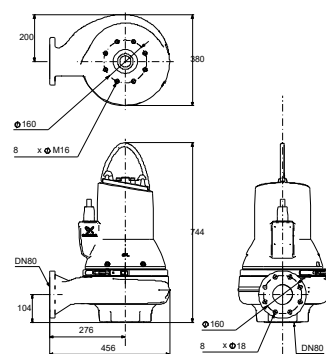
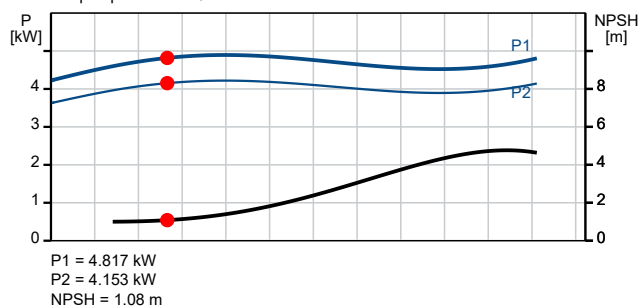
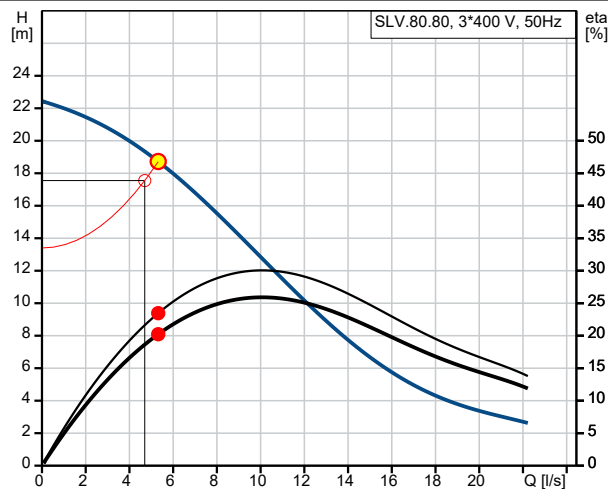


Q = 5.32 l/s
H = 18.72 m
Liquid temperature during operation = 20 °C
Eta pump = 23.5 %
Eta pump+motor = 20.2 %



P1 = 4.817 kW
P2 = 4.153 kW
NPSH = 1.08 m

Description	Value
General information:	
Product name:	SLV.80.80 .40.2.51D.C
Product No:	98626039
EAN number:	5711498465077
Price:	GBP 4127
Technical:	
Actual calculated flow:	5.32 l/s
Maximum flow:	22.2 l/s
Resulting head of the pump:	18.72 m
Maximum head:	24.5 m
Type of impeller:	SUPER VORTEX
Maximum particle size:	80 mm
Primary shaft seal:	SIC/SIC
Approvals:	CE EN12050-1
Curve tolerance:	ISO9906:2012 3B2
Cooling jacket:	without cooling jacket
Rated speed:	2930 rpm
Materials:	
Pump housing:	Cast iron
Pump housing:	EN 5.1301 EN-GJL-250
Impeller:	Cast iron
Impeller:	EN 5.1301 EN-GJL-250
Motor:	EN-GJL-250
Installation:	
Range of ambient temperature:	0 .. 40 °C
Maximum operating pressure:	6 bar
Flange standard:	DIN
Type of inlet connection:	DIN
Type of outlet connection:	DIN
Size of inlet connection:	DN 80
Size of outlet connection:	DN 80
Pressure rating:	PN 10
Maximum installation depth:	20 m
Inst dry/wet:	SUBMERGED
Installation:	Vertical
Auto-coupling:	96090993
Frame range:	C22
Liquid:	
Pumped liquid:	Any Newtonian liquid
Liquid temperature range:	10 .. 40 °C
Selected liquid temperature:	20 °C
Density:	998.2 kg/m ³
Electrical data:	
Power input - P1:	4.9 kW
Rated power - P2:	4 kW
Mains frequency:	50 Hz
Rated voltage:	3 x 380-415 V
Voltage tolerance:	+10/-10 %
Max starts per hour:	20
Rated current:	8.2 A
Starting current:	86 A
Cos phi - power factor:	0.88
Cos phi - p.f. at 3/4 load:	0.83
Cos phi - p.f. at 1/2 load:	0.77
Rated speed:	2930 rpm
Motor efficiency at full load:	86.2 %
Motor efficiency at 3/4 load:	85.3 %
Motor efficiency at 1/2 load:	83.2 %





Company name: All Pump Solution

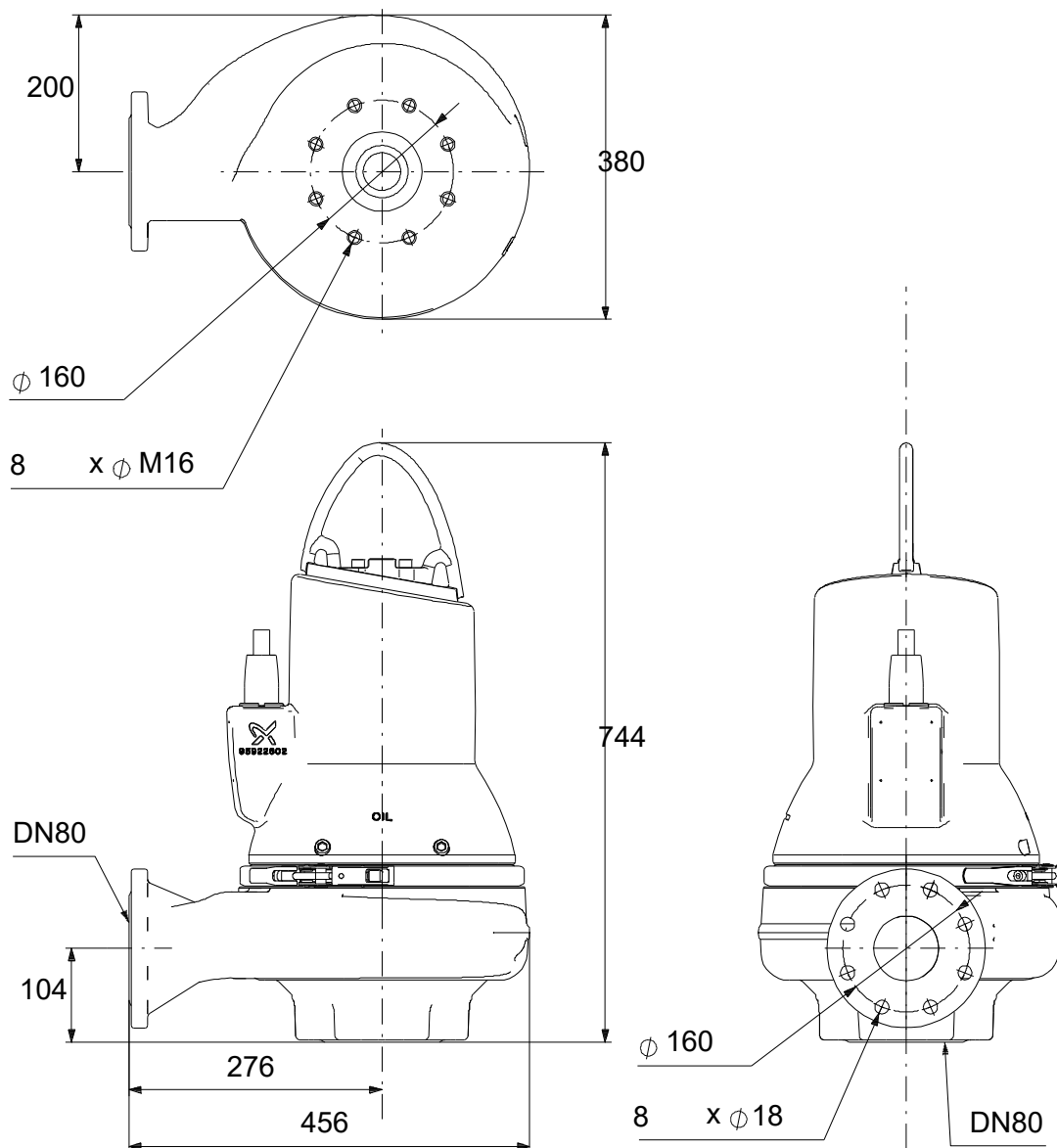
Created by:

Phone:

Date: 08/06/2023

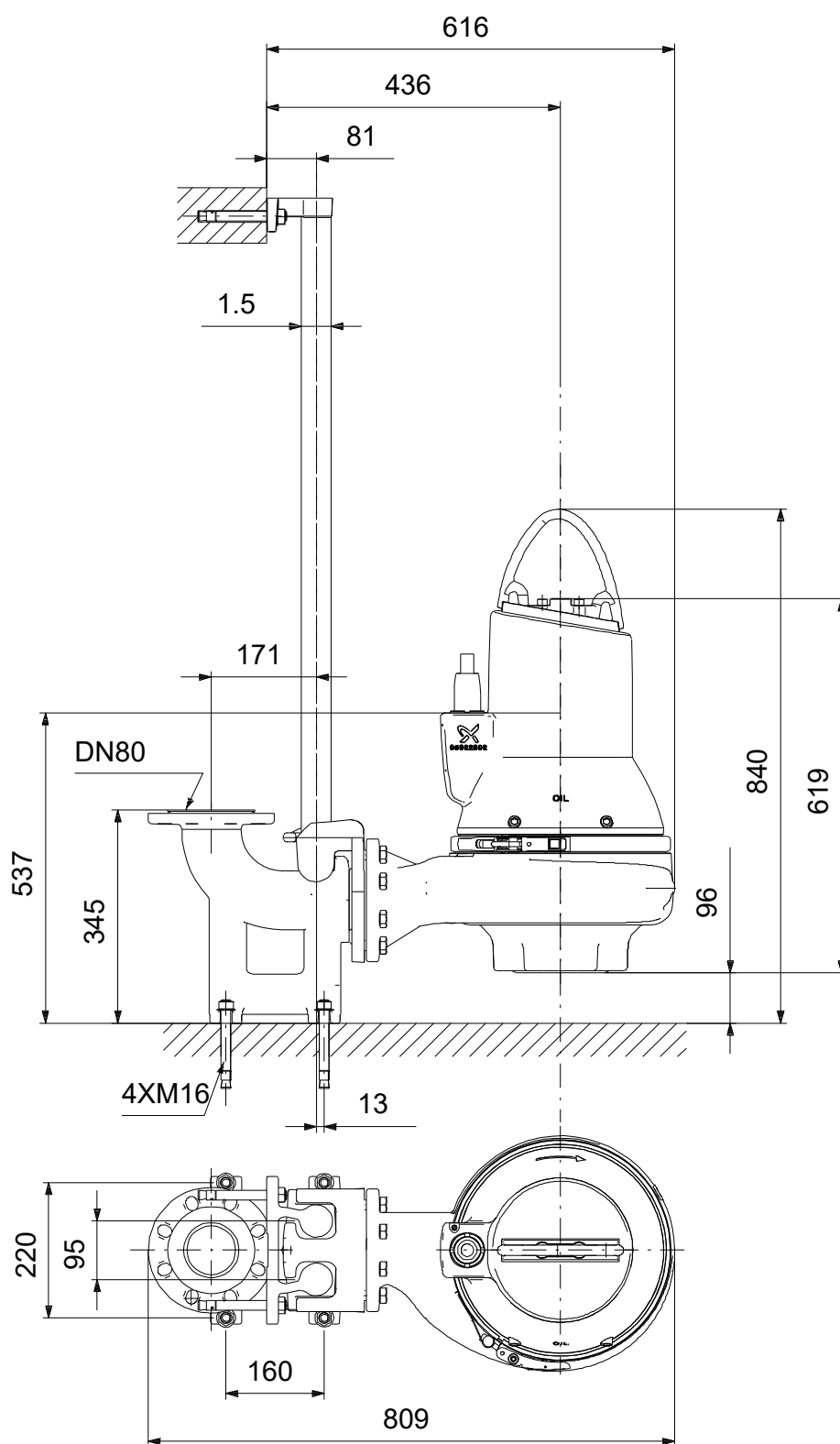
Description	Value
Number of poles:	2
Start. method:	star/delta
Enclosure class (IEC 34-5):	IP68
Insulation class (IEC 85):	H
Explosion proof:	no
Built-in motor protection:	THERMAL SWITCH
Cable type:	LYNIFLEX
Length of power cable:	10 m
Controls:	
Control box:	not included
Moisture sensor:	with moisture sensors
Water-in-oil sensor:	without water-in-oil sensor
Others:	
Net weight:	121 kg
Danish VVS No.:	391299224
Finnish LVI No.:	4836121
Country of origin:	HU
Custom tariff no.:	84137021

98626039 SLV.80.80 .40.2.51D.C 50 Hz



Note! All units are in [mm] unless others are stated.
Disclaimer: This simplified dimensional drawing does not show all details.

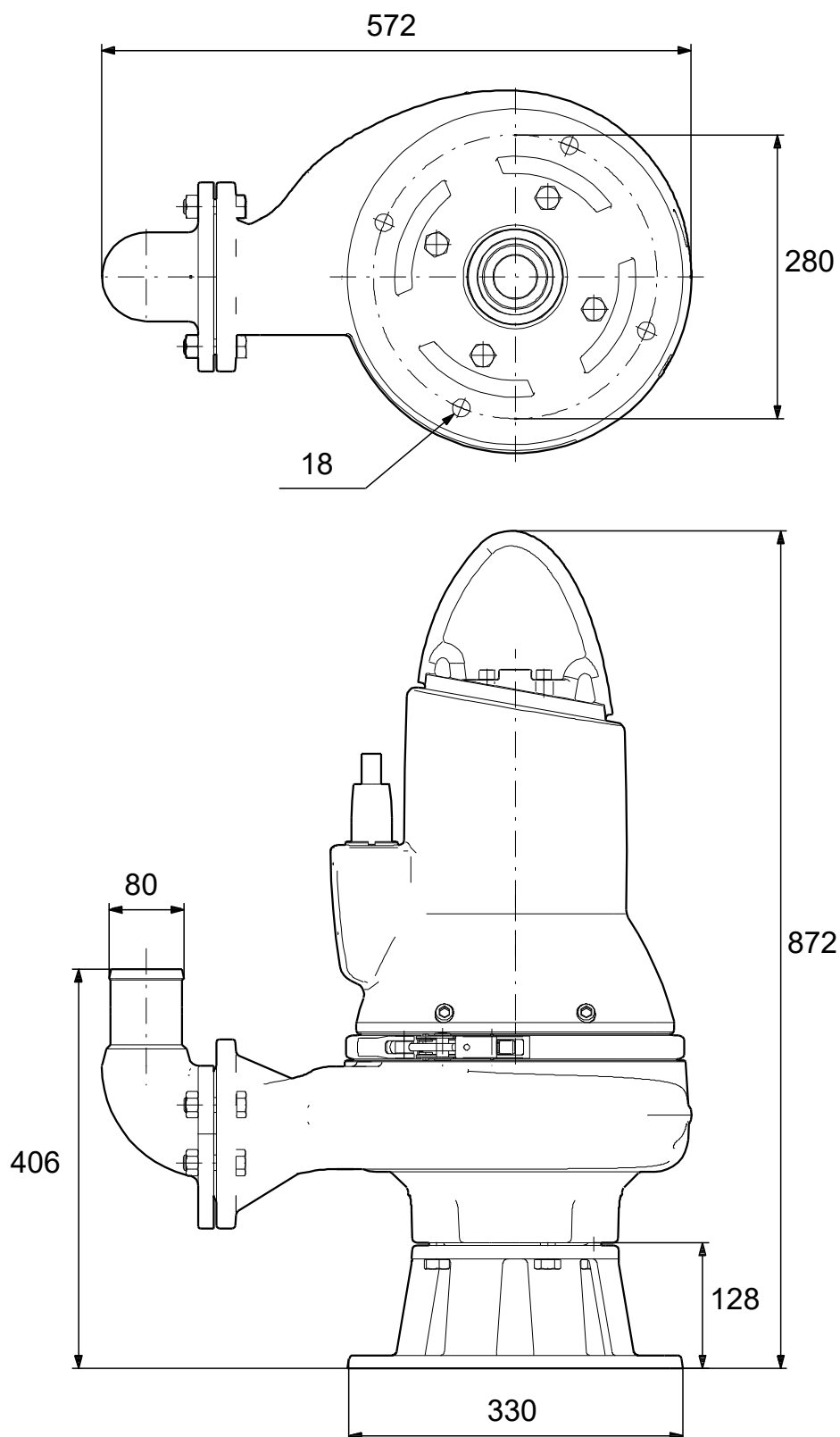
98626039 SLV.80.80 .40.2.51D.C 50 Hz



Note! All units are in [mm] unless others are stated.

Disclaimer: This simplified dimensional drawing does not show all details.

98626039 SLV.80.80 .40.2.51D.C 50 Hz



Note! All units are in [mm] unless others are stated.
Disclaimer: This simplified dimensional drawing does not show all details.

NP 3085 SH 3~ Adaptive 254

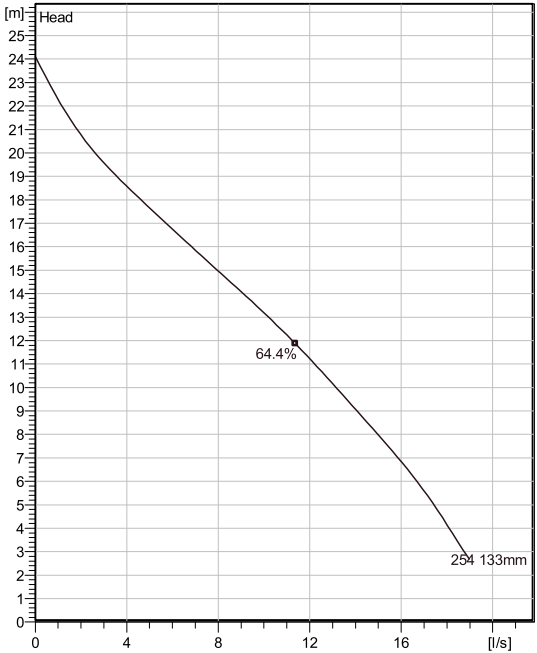
Patented self cleaning semi-open channel impeller, ideal for pumping in most waste water applications. Modular based design with high adaptation grade.



Technical specification



Curves according to: Water, pure Water, pure [100%], 4 °C, 999.9 kg/m³, 1.5692 mm²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances. Please consult your local Flygt representative for performance guarantees.

Configuration

Motor number N3085.160 15-09-2AL-W 2.4KW	Installation type P - Semi permanent, Wet
Impeller diameter 133 mm	Discharge diameter 80 mm

Configuration

Pump information

Impeller diameter 133 mm
Discharge diameter 80 mm
Inlet diameter 100 mm
Maximum operating speed 2870 rpm
Number of blades 2
Max. fluid temperature 40 °C

Material

Impeller Grey cast iron
Stator housing material Grey cast iron

Project	Xylect-20688581	Created by	Garryson Robles
Block		Created on	6/8/2023
		Last update	6/8/2023

NP 3085 SH 3~ Adaptive 254

Technical specification



Motor - General

Motor number N3085.160 15-09-2AL-W 2.4KW	Phases 3~	Rated speed 2870 rpm	Rated power 2.4 kW
Approval No	Number of poles 2	Rated current 4.8 A	Stator variant 38
Frequency 50 Hz	Rated voltage 400 V	Insulation class H	Type of Duty S1
Version code 160			

Motor - Technical

Power factor - 1/1 Load 0.89	Motor efficiency - 1/1 Load 81.6 %	Total moment of inertia 0.0069 kg m ²	Starts per hour max. 30
Power factor - 3/4 Load 0.84	Motor efficiency - 3/4 Load 82.9 %	Starting current, direct starting 30 A	
Power factor - 1/2 Load 0.74	Motor efficiency - 1/2 Load 82.2 %	Starting current, star-delta 10 A	

Project Xylect-20688581
Block

Created by Garryson Robles
Created on 6/8/2023 **Last update** 6/8/2023

NP 3085 SH 3~ Adaptive 254

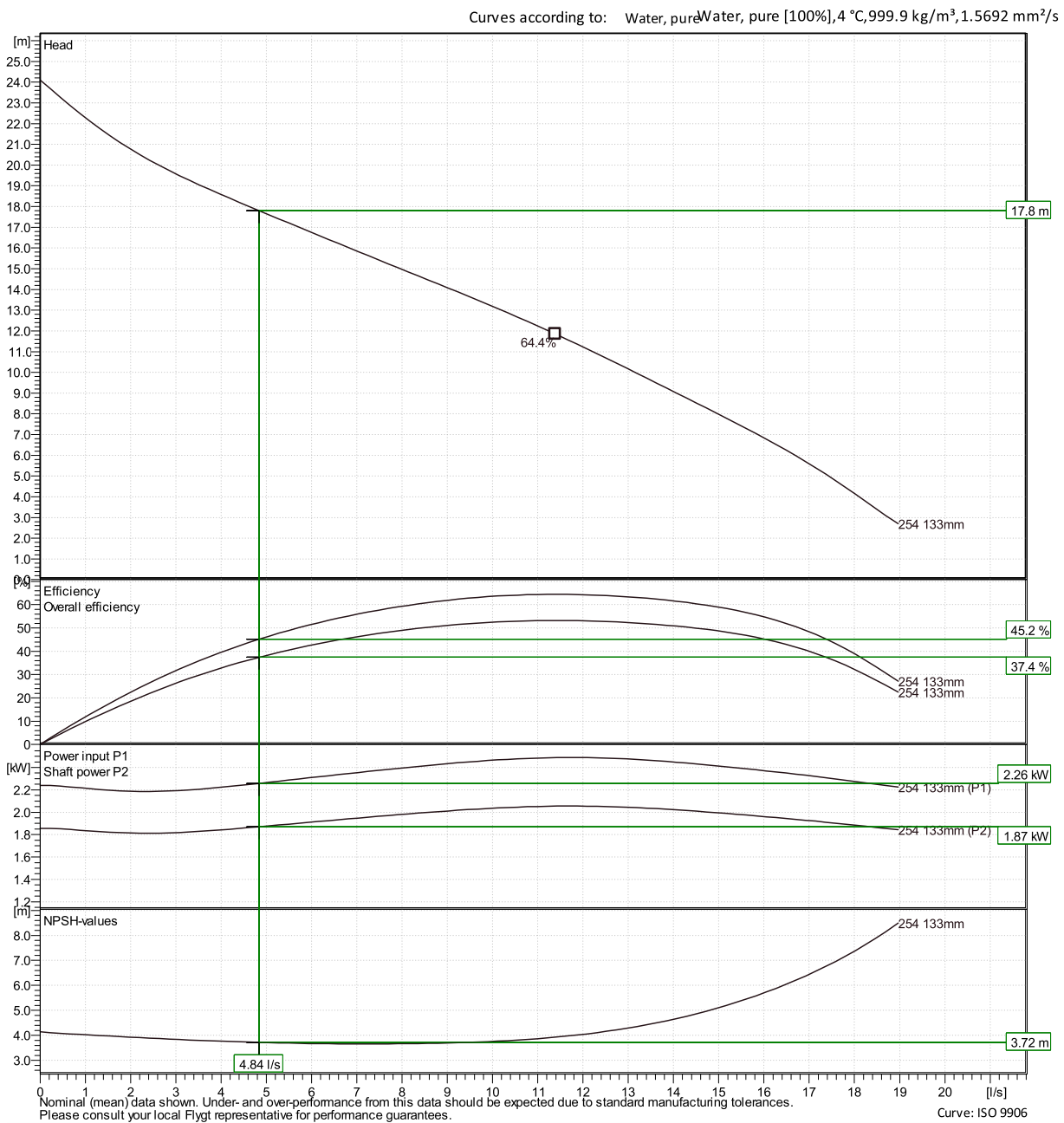
Performance curve



Duty point

Flow
4.84 l/s

Head
17.8 m



Xylect-20688581

Garryson Robles

Created on

6/8/2023

Last update

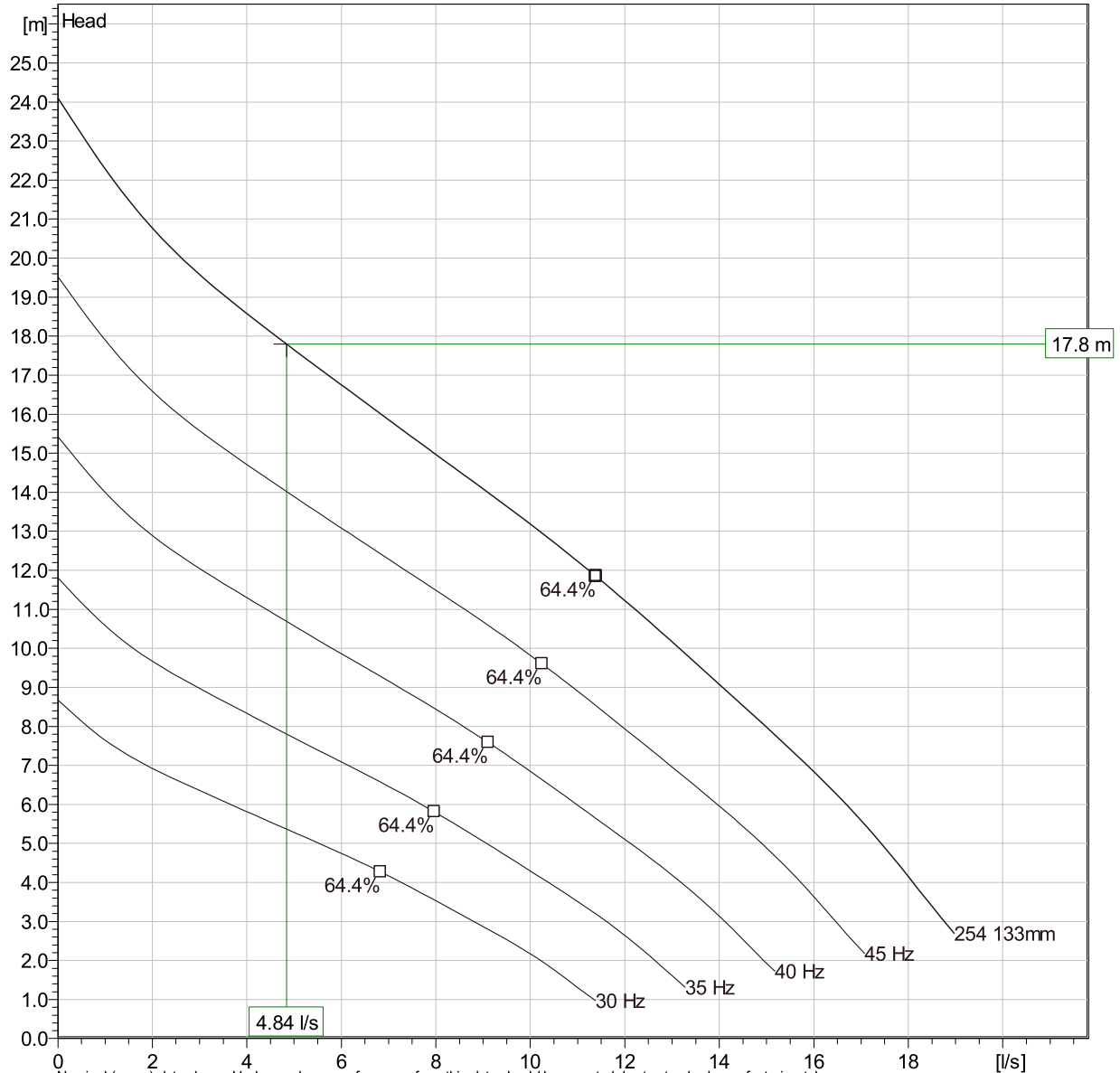
6/8/2023

NP 3085 SH 3~ Adaptive 254

Duty Analysis



Curves according to: Water, pure [100%] ; 4°C; 999.9kg/m³; 1.5692mm²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Operating characteristics

Pumps / Systems	Flow l/s	Head m	Shaft power kW	Flow l/s	Head m	Shaft power kW	Hydr. eff.	Spec. Energy kWh/m³	NPSHre m
1	4.84	17.8	1.87	4.84	17.8	1.87	45.2 %	0.13	3.72

Project
Block

Xylect-20688581

Created by
Created on

Garryson Robles
6/8/2023

Last update

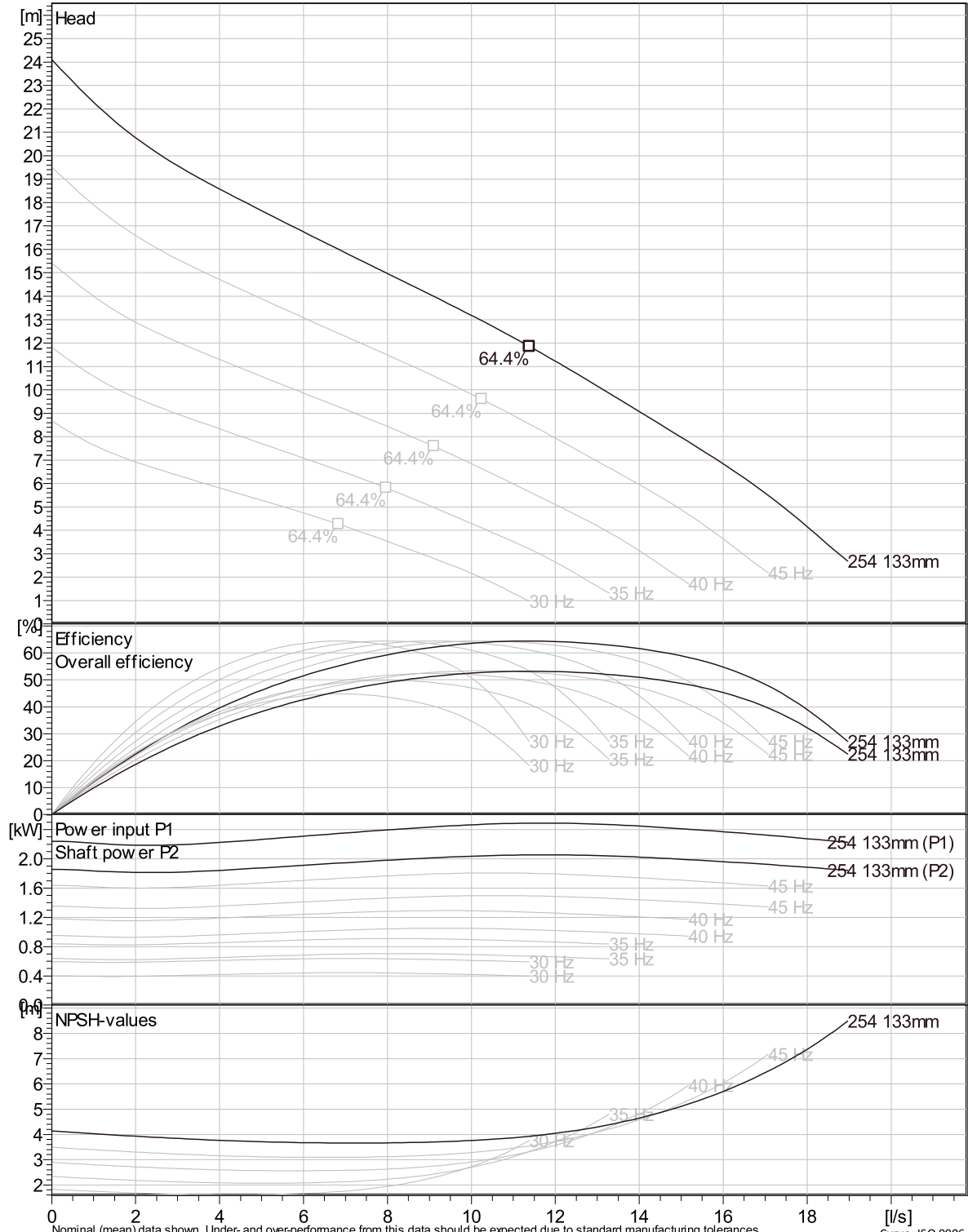
6/8/2023

NP 3085 SH 3~ Adaptive 254

VFD Curve



Curves according to: Water, pure, 4 °C, 999.9 kg/m³, 1.5692 mm²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances. Please consult your local Flygt representative for performance guarantees.

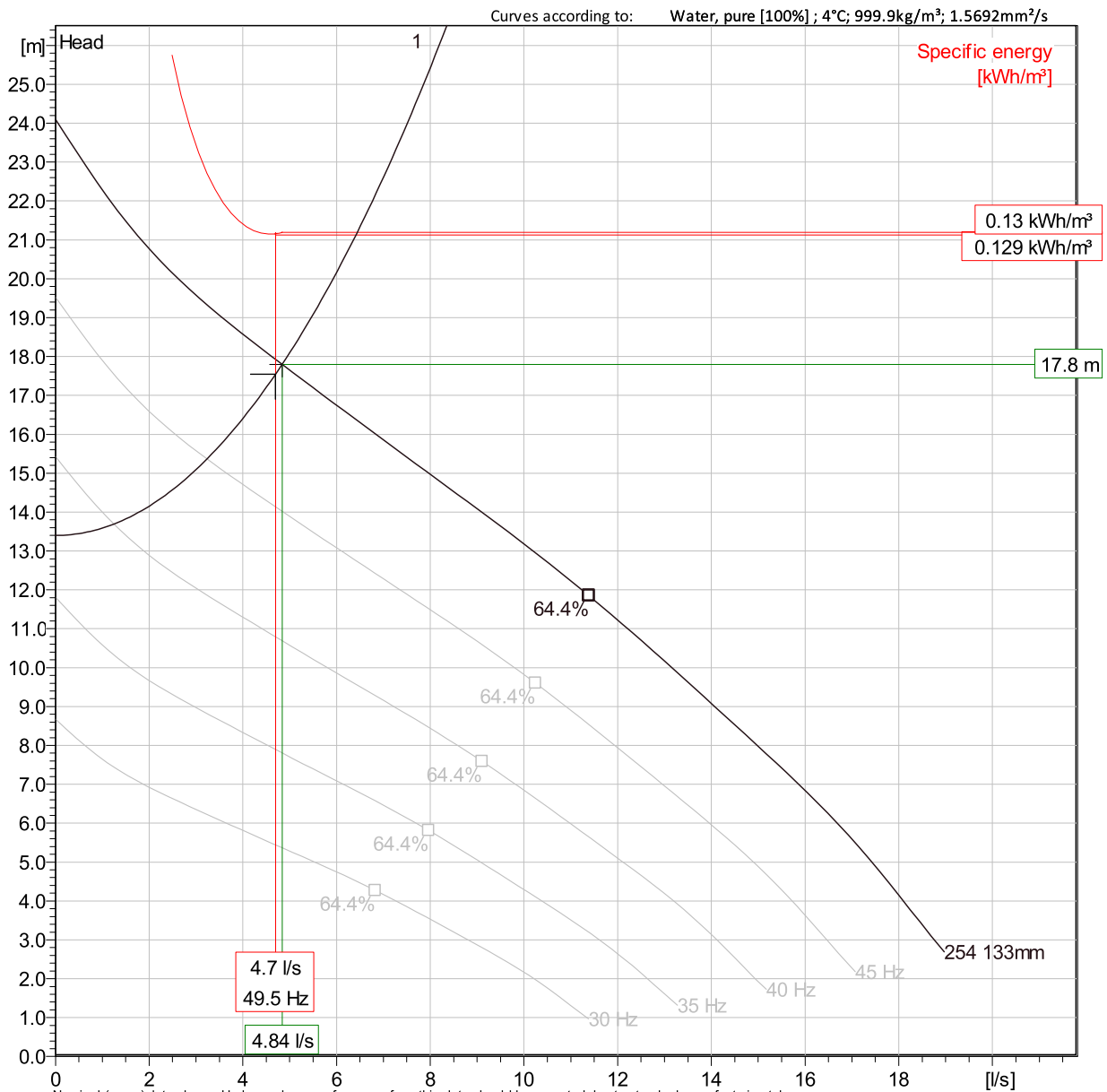
Curve: ISO 9906

Project Xylect-20688581
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Created by Garryson Robles
Created on 6/8/2023 Last update 6/8/2023

NP 3085 SH 3~ Adaptive 254

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr. eff.	Specific energy	NPSHre
		l/s	m	kW	l/s	m	kW		kWh/m³	m
1	50 Hz	4.84	17.8	1.87	4.84	17.8	1.87	45.2 %	0.13	3.72
1	45 Hz	3.23	15.4	1.33	3.23	15.4	1.33	36.6 %	0.139	3.21
1	40 Hz	1.25	13.7	0.932	1.25	13.7	0.932	17.9 %	0.258	2.78
1	35 Hz									

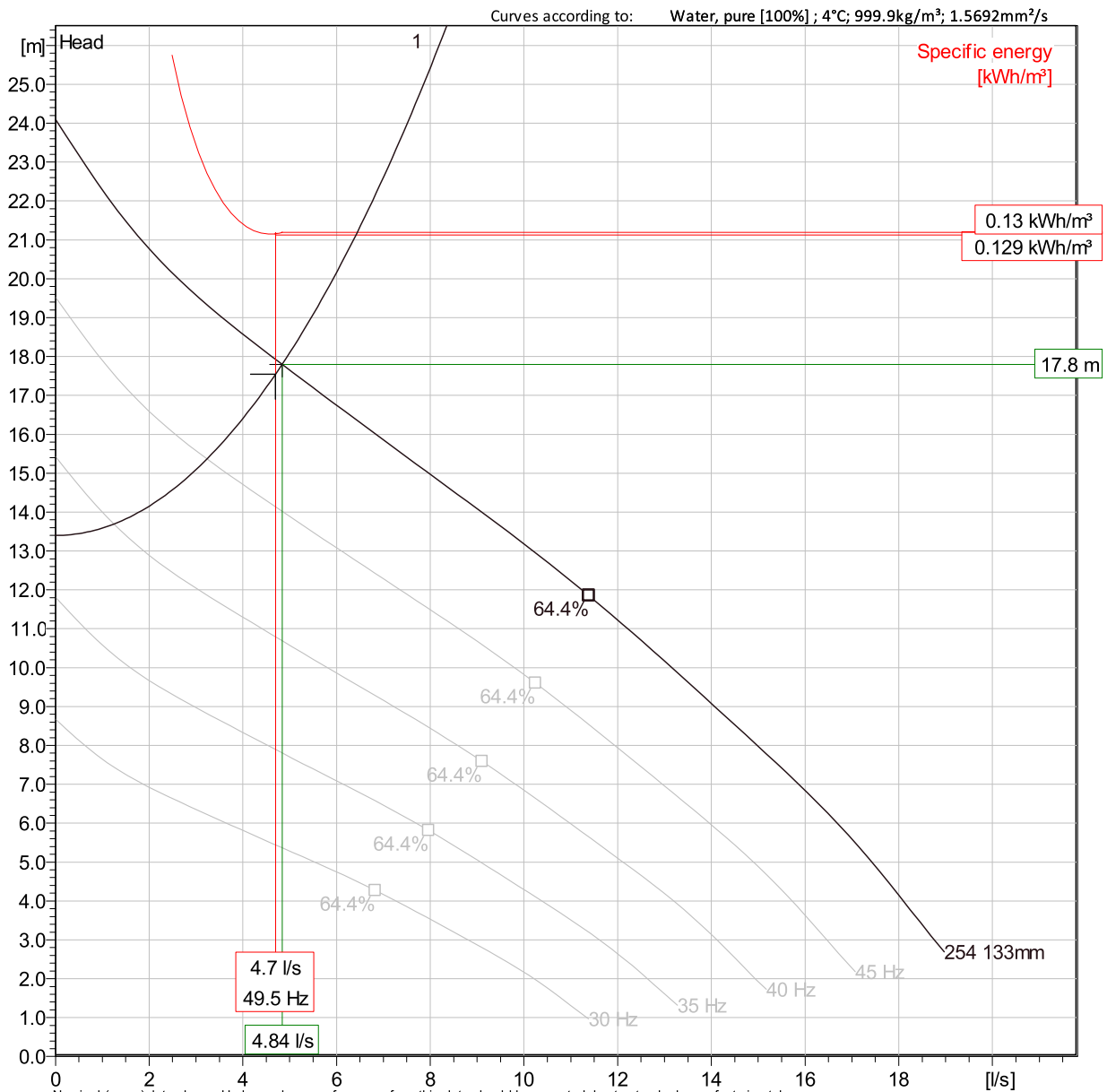
Project Xylect-20688581
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Last update 6/8/2023

NP 3085 SH 3~ Adaptive 254

VFD Analysis



Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr. eff.	Specific energy	NPSHre
		l/s	m	kW	l/s	m	kW		kWh/m³	m
1	30 Hz									

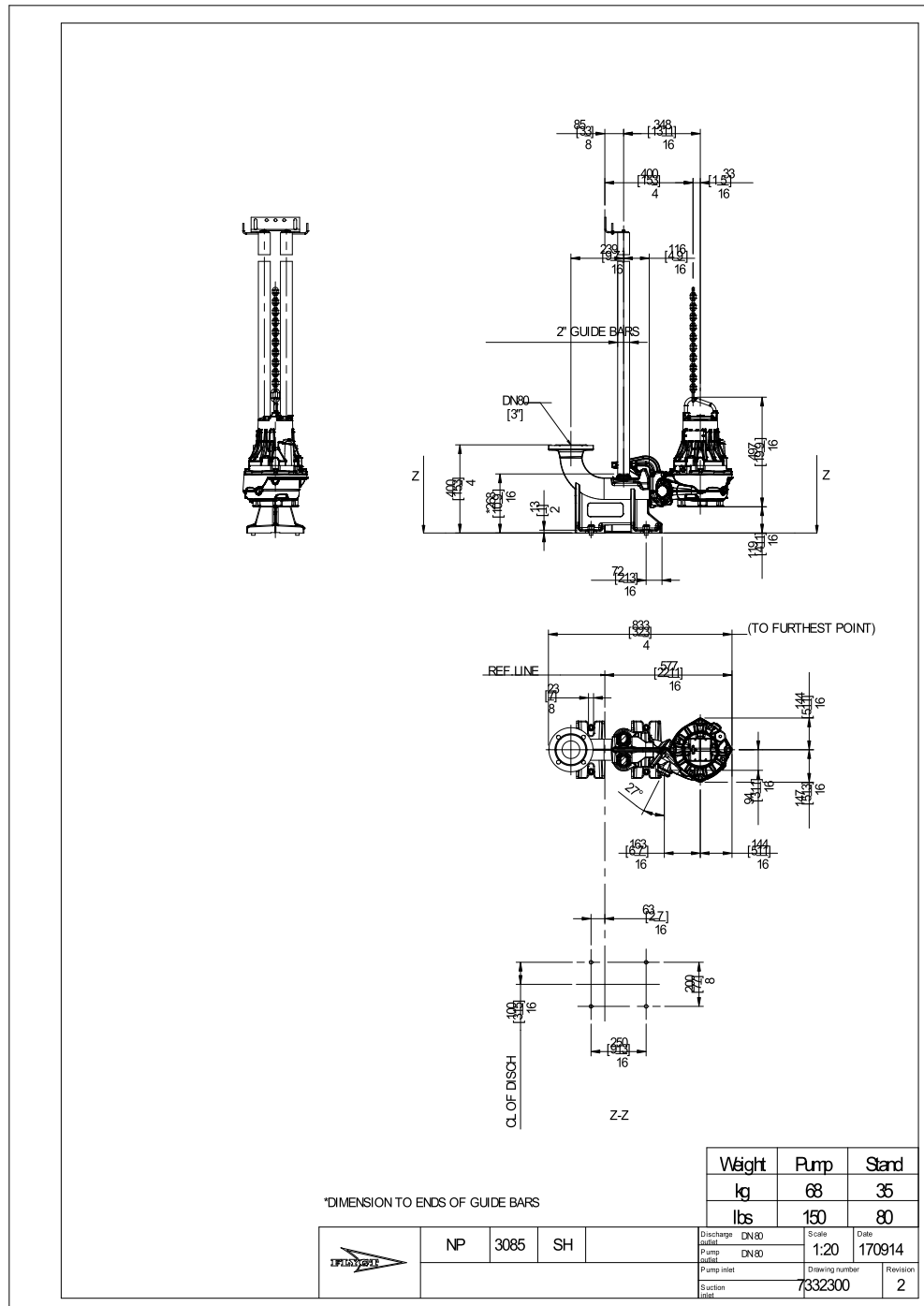
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Last update 6/8/2023

NP 3085 SH 3~ Adaptive 254

Dimensional drawing



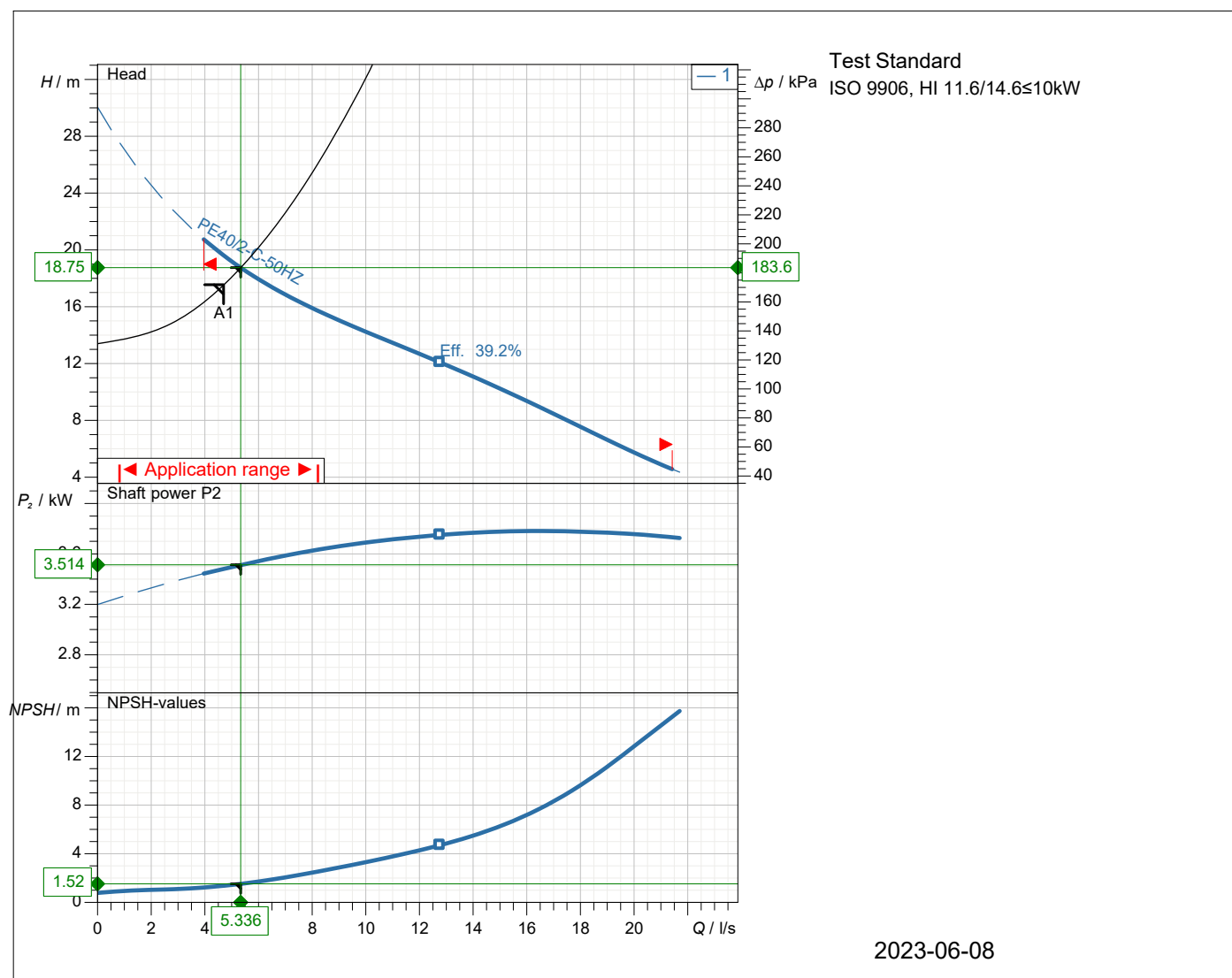
Project Xylect-20688581
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Created by Garryson Robles

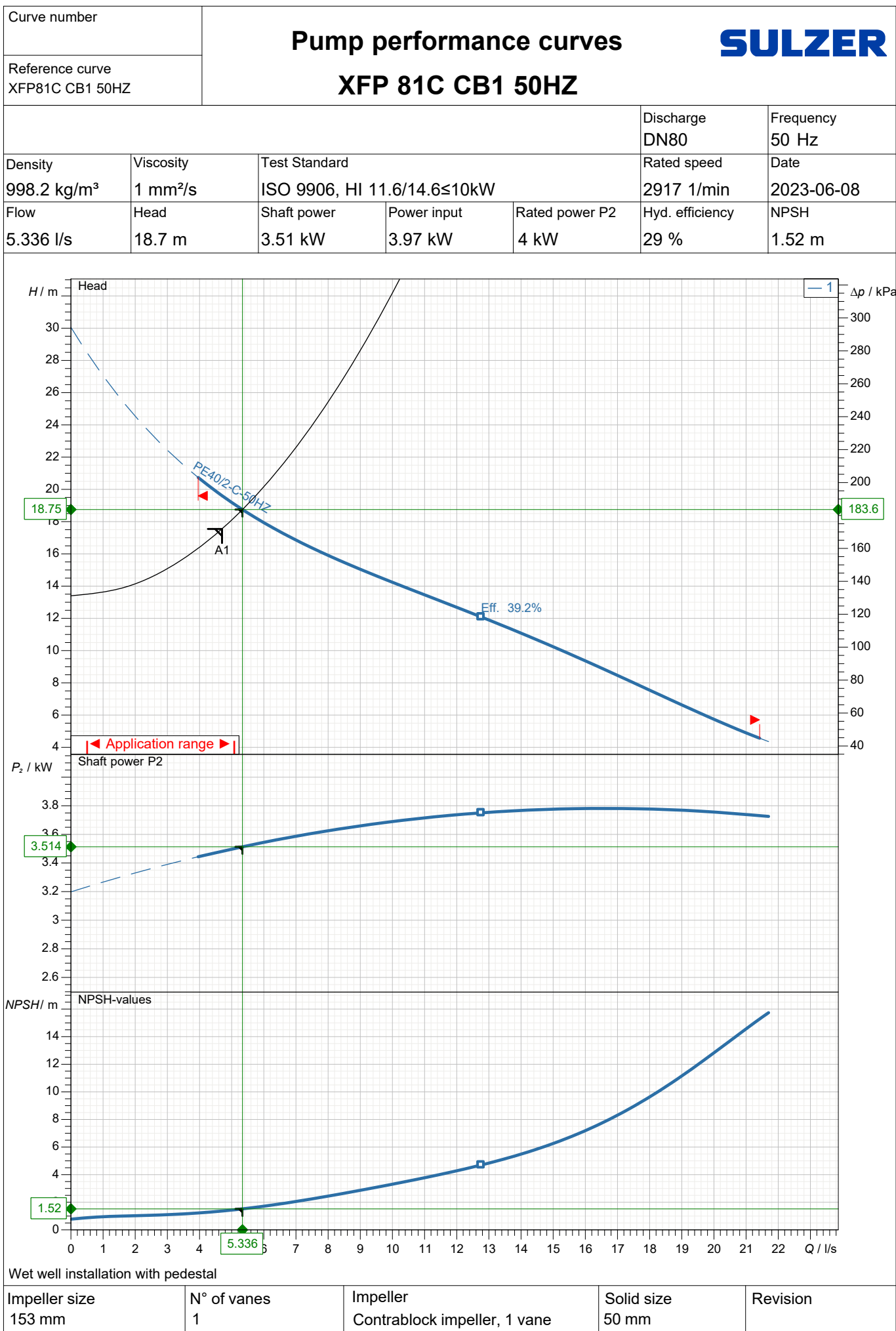
Created on 6/8/2023 Last update

6/8/2023

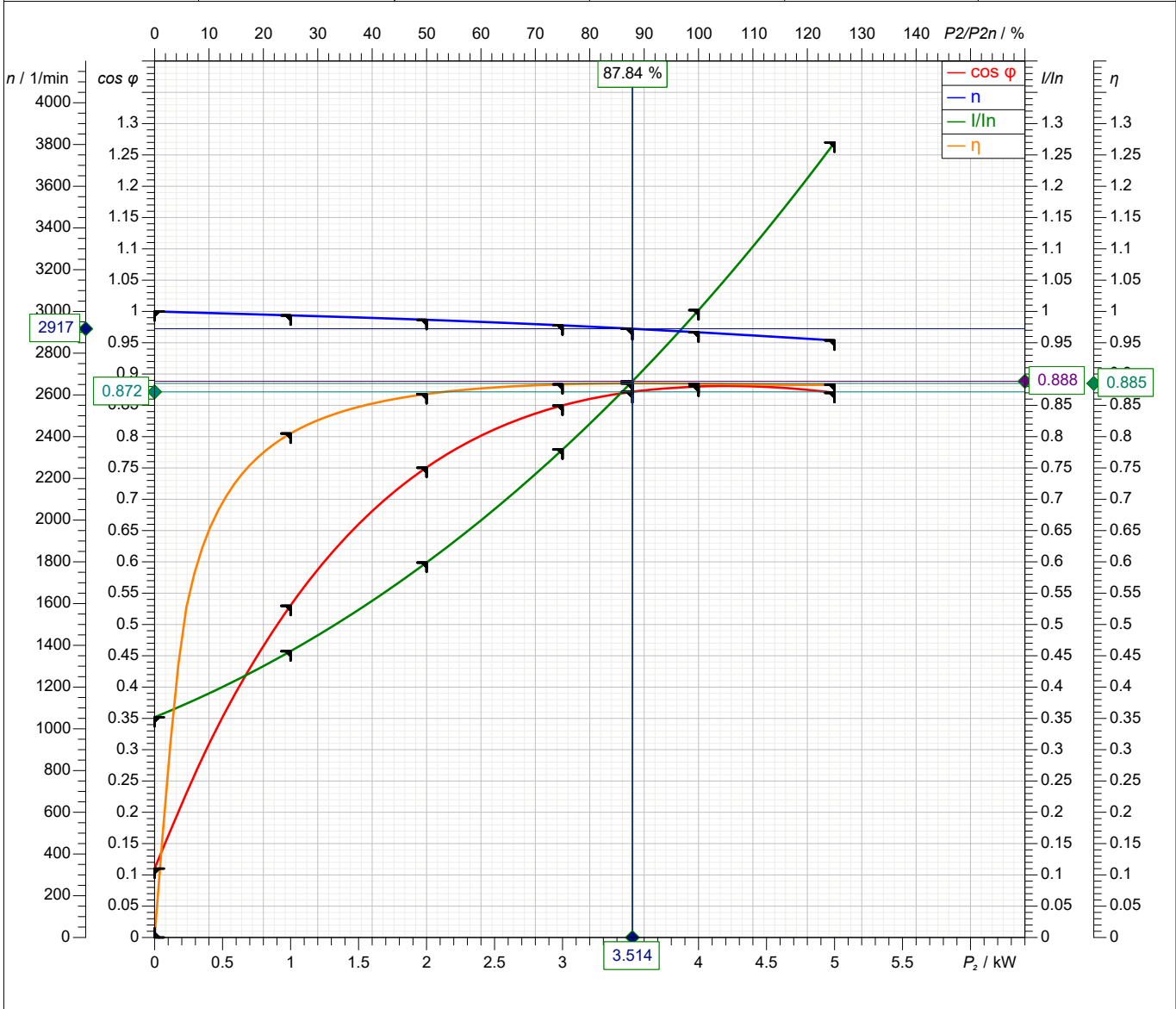
XFP 81C CB1 50HZ



Operating data specification		Power input		3.97 kW
Flow	5.336 l/s	Head		18.7 m
Efficiency	29 %	Shaft power		3.51 kW
NPSH	1.52 m	Fluid		Wastewater
Temperature	20 °C	Nature of system		Single head pump
No. of pumps	1			
Pump data				
Type	XFP 81C CB1 50HZ	Make		SULZER
Series	XFP PE1-PE3	Impeller		Contrablock impeller, 1 vane
N° of vanes	1	Impeller size		153 mm
Free passage	50 mm	Suction flange		DN100
Discharge flange	DN80	Type of installation		Wet well installation with pedestal
Moment of inertia	0.0067 kg m ²			
Motor data				
Rated voltage	400 V	Frequency		50 Hz
Rated power P2	4 kW	Nominal Speed		2900 1/min
Number of poles	2	Efficiency		88.4 %
Power factor	0.88	Rated current		7.4 A
Starting current	64 A	Rated torque		13.2 Nm
Starting torque	51.9 Nm	Degree of protection		IP 68
Insulation class	H	No. starts per hour		15



Rated power 4 kW	Service factor 1.3	Nominal Speed 2900 1/min	Number of poles 2	Rated voltage 400 V	Date 2023-06-08
---------------------	-----------------------	-----------------------------	----------------------	------------------------	--------------------



Symbol	No load	25 %	50 %	75 %	100 %	125 %
P2/ kW	0	1	2	3	4	5
P1/ kW	0.1985	1.242	2.304	3.395	4.522	5.664
I / A	2.603	3.384	4.432	5.768	7.416	9.397
cos φ	0.11	0.5298	0.7504	0.8496	0.8802	0.87
n / 1/min	3000	2981	2960	2933	2900	2861
s / %	0.0005291	0.6307	1.339	2.228	3.336	4.633
M / Nm	0	3.203	6.453	9.767	13.17	16.69
η / %	0	80.5	86.8	88.36	88.45	88.28

Tolerance according to VDE 0530 T1 12.84 for rated power					
Starting current 64 A	Starting torque 51.9 Nm	Moment of inertia 0.005 kg m ²	No. starts per hour 15		

APPENDIX C.

PRODUCT DATA SHEETS

GRUNDFOS SL1 AND SLV RANGES

Submersible wastewater pumps 1.5 – 15 HP

60 Hz North America

THE SL PUMP: CREATED WITH YOUR SYSTEMS IN MIND

Submersible pumps for wastewater applications



BE > THINK > INNOVATE >

GRUNDFOS 

MEET THE NEW SL!

Long-lasting, service-friendly submersible wastewater pumps

The newly extended SL range is industrial design at its best. Created to optimise performance in your system, these pumps minimize risk factors, reduce maintenance requirements, and last longer.

Like any Grundfos product, SL pumps are remarkably durable. They employ innovative features – several of them unique to Grundfos – to minimise known risk factors. The SL pumps enables you to plan service visits for maximum efficiency, resulting in shorter service visits.

The SL pumps work with your system. They give you the choice – of impeller, of sensors, of speed control, etc. – that you need for the ideal pump set-up. Grundfos can give you design support for optimum result.



THE SL AT WORK

For domestic wastewater, municipal wastewater, industrial wastewater, and process water

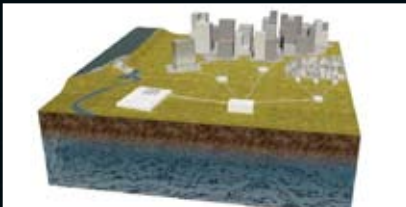
SL pumps are designed for submerged use in:

- network pumping stations
- wastewater treatment plants
- public buildings
- housing projects
- industry

SL pumps will handle:

- municipal wastewater
- wastewater with fibres
- drainage and groundwater
- industrial wastewater
- process and cooling water

For even more demanding applications, a wide range of customizing possibilities is available, e.g. casted parts in various Stainless steel grades.



SL pumps can be used for alternating or continuous operation throughout the water cycle.

See examples online.



In large-scale applications, the submerged SL pumps will handle continuous operation with ease.



Installation options include submerged installation on auto-coupling with guide rails.



In smaller pumping stations, alternating SL pumps meet peak demands while ensuring efficient operation overall.

SL PUMP FEATURES

– and what they do for you



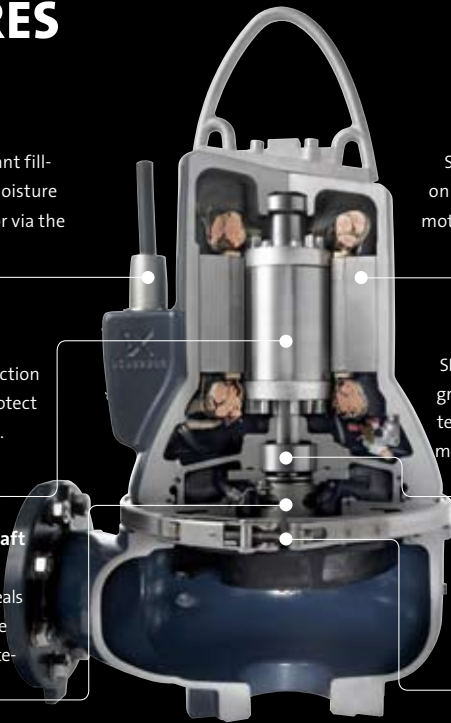
Moisture-proof plug
A two-component sealant filling the plug prevents moisture from entering the motor via the cable core.



Short rotor shaft
Compact motor construction reduces vibrations to protect shaft seals and bearings.



Double mechanical shaft seal
Primary and secondary seals are combined into a single cartridge to reduce maintenance time.



Eff1-type motor
SL models have motors based on Eff1 components, improving motor efficiency and prolonging pump life.



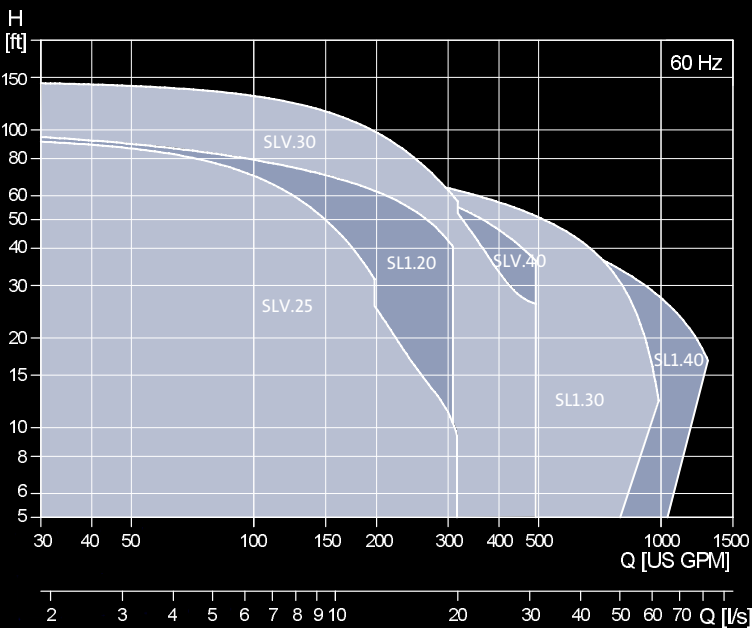
Many sensor options
SL models are available w/ integrated analogue sensors, motor temperature, water in the intermediate oil chamber, and motor insulation resistance.



Easy-to-open clamp
Easy access for pump maintenance. Enables 180° rotation of the motor positioning.



Performance overview



SuperVortex impeller

SuperVortex impeller pumps (SLV) are available for free passage of solids up to 4" / 100 mm. Ideal for liquids with high content of solids, fibres, or gassy sludge.



Channel impeller

Channel impeller pumps (SL1) are available for free passage of solids up to 4" / 100 mm. Ideal for large flows of raw sewage.



The entire range is available in explosion-proof versions. All SL1 and SLV models with motors from 1.5 HP to 15 HP are provided with a Class 1, Division 1, Groups C and D T4 and T3 explosion-protection classification according to UL 778 C22.2 No. 108 and FM 3600. FM3615 and FM3615.80

SEE THE BIGGER PICTURE

Grundfos is a global leader within water handling technology. Our passion is to bring you all the products you require to create and operate pump systems that combine reliability, cost-efficiency – and innovation. Our products are for use in water supply and wastewater infrastructure on any scale.

Grundfos has a full line of products and systems for the intake, treatment, and distribution of drinking water and for the transport and treatment of wastewater. We also offer expertise and industry insight that can increase reliability and reduce lifecycle costs for water utilities.

Key product areas include:



Submersible pumps



Surface pumps



Sewage pumps



Mixers, flowmakers & recirculation pumps



Pumping stations



Monitoring & controls



Dosing & disinfection



Aeration equipment

Our products are the result of decades of engineering expertise. Supported by a worldwide service network.

SIEMENS



Ultrasonic Controllers

SITRANS LUT400 (HART)

Operating Instructions

Edition

12/2014

Introduction

The Manual

Notes:

- This product is intended for use in industrial areas. Operation of this equipment in a residential area may cause interference to several frequency based communications.
- Please follow the installation and operating procedures for a quick, trouble-free installation and to ensure the maximum accuracy and reliability of your SITRANS LUT400.
- This manual applies to the SITRANS LUT400 series only.

This manual will help you set up your SITRANS LUT400 for optimum performance. We always welcome suggestions and comments about manual content, design, and accessibility. Please direct your comments to techpubs.smpi@siemens.com.

For other Siemens level measurement manuals, go to: www.siemens.com/level, and look under **Level Measurement**.

Manual symbols

Please note their use carefully.

	Alternating Current
	Direct Current
	Earth (ground) Terminal
	Protective Conductor Terminal
	Caution (refer to instructions)
	No co-axial cable connections

Application examples

The application examples used in this manual illustrate typical installations using SITRANS LUT400. As there is often a range of ways to approach an application, other configurations may also apply.

In all examples, substitute your own application details. If the examples do not apply to your application, check the applicable parameter reference for the available options.

Change History

Sensor node

Firmware Rev.	PDM EDD Rev.	Date	Changes
1.00.00	1.00.00	August 3, 2012	Initial release.
1.00.01	1.00.01	October 1, 2012	- Totalizers values are maintained over a power loss. - Alarms now trip at or beyond setpoints, instead of just beyond. - Alarm log files now contain values in user-selected units. Those units are also logged into files. - OCM Totalizer values that appear in data log files now in flow units.
1.01.00	1.01.00	June 1, 2013	Added 'mega-gallons per day' flow unit.
1.01.01	1.01.01	February 1, 2014	Added Russian, Portuguese and Italian language support.
1.02.00	1.02.00	December 1, 2014	Added user changeable password and First In, First Out datalog option.

LUI

Firmware Rev.	Date	Changes
1.00.00	August 3, 2012	Initial release.
1.01.00	June 1, 2013	- Level value or level units are now recorded for an in-bounds level alarm in the alarm log. - Correction of flow rate on exponential devices using absolute calculation.
1.01.01	February 1, 2014	Added Russian, Portuguese and Italian language support.
1.02.00	December 1, 2014	Added user changeable password and First In, First Out datalog option.

Safety Notes

Special attention must be paid to warnings and notes highlighted from the rest of the text by grey boxes.



WARNING: relates to a caution symbol on the product, and means that failure to observe the necessary precautions can result in death, serious injury, and/or considerable material damage.



WARNING¹: means that failure to observe the necessary precautions can result in death, serious injury, and/or considerable material damage.

Note: means important information about the product or that part of the operating manual.

Safety marking symbols

In manual	On product	Description
		Earth (ground) Terminal (shield)
		Protective Conductor Terminal
		Dispose of in an environmentally safe manner, and according to local regulations.
		WARNING: refer to accompanying documents (manual) for details.
		CAUTION: Observe electrostatic discharge precautions prior to handling electronic components within the wiring compartment.

¹. This symbol is used when there is no corresponding caution symbol on the product.

FCC Conformity

US Installations only: Federal Communications Commission (FCC) rules

! WARNING: Changes or modifications not expressly approved by Siemens could void the user's authority to operate the equipment.

Notes:

- This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.
- This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference to radio communications, in which case the user will be required to correct the interference at his own expense.

CE Electromagnetic Compatibility (EMC) Conformity

This equipment has been tested and found to comply with the following EMC Standards:

EMC Standard	Title
CISPR 11:2004/EN 55011: 2009, CLASS A	Limits and methods of measurements of radio disturbance characteristics of industrial, scientific, and medical (ISM) radio-frequency equipment.
EN 61326-1: 2006 IEC 61326-1: 2005	Electrical Equipment for Measurement, Control and Laboratory Use – Electromagnetic Compatibility.
EN61000-3-2: 2006	Electromagnetic Compatibility (EMC) Part 3-2: Limits for harmonic current emissions (equipment input current $\leq 16\text{A}$ per phase).
EN61000-3-3: 2008 A1: 2001 + A2: 2005	Electromagnetic Compatibility (EMC) Part 3-3: Limitation of voltage changes, voltage fluctuations, and flicker in public low voltage supply systems, for equipment with rated current $\leq 16\text{A}$ per phase and not subject to conditional connection.
EN61000-4-2:2009	Electromagnetic Compatibility (EMC) Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test.
EN61000-4-3:2006	Electromagnetic Compatibility (EMC) Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test.
EN61000-4-4:2004	Electromagnetic Compatibility (EMC) Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test.
EN61000-4-5:2006	Electromagnetic Compatibility (EMC) Part 4-5: Testing and measurement techniques – Surge immunity test.

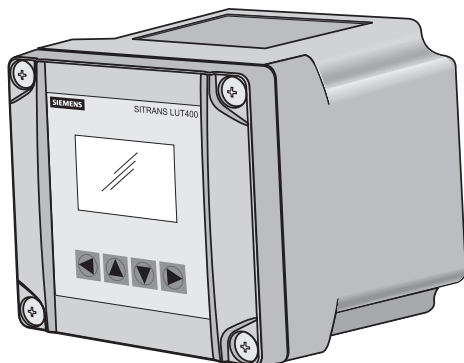
EMC Standard	Title
EN61000-4-6:2009	Electromagnetic Compatibility (EMC) Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields.
EN61000-4-8:2010	Electromagnetic Compatibility (EMC) Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test.
EN61000-4-11: 2004	Electromagnetic Compatibility (EMC) Part 4-11: Testing and measurement techniques - voltage clips, short interruptions and voltage variations immunity tests.

Description

Overview

The Siemens SITRANS LUT400 series controllers are compact, single point, long-range ultrasonic controllers for continuous level measurement of liquids, slurries, and solids, and high accuracy monitoring of open channel flow.

The series is compatible with Siemens full line of EchoMax[®] Transducers, allowing an operating range of 0.3 to 60 meters (dependent on transducer). The SITRANS LUT400 has been coupled with a backlit Local User Interface (LUI) display featuring menu driven programming and a host of wizards for plug and play performance. The LUT400 also features our next generation of Sonic Intelligence[®], further strengthening our industry leading measurement performance while improving ease of use. With a number of advanced pump, alarm, and flow control features, plus a real time clock and an integrated datalogger, the LUT400 is a powerful and comprehensive solution for your Ultrasonic applications.



Features

- Small 1/2 DIN enclosure footprint with standard universal mounting bracket for wall, pipe, and DIN rail, plus an optional panel mount
- Easy to use LUI display with local four-button programming, menu-driven parameters, and Wizard support for key applications
- Level, Volume, High Accuracy OCM Flow monitoring
- Three relays combined with a suite of pump, alarm, and relay control features
- HART Communications
- EDDs for SIMATIC PDM, AMS Device Manager, and Field Communicator 375/475, plus DTMs for FDTs (Field Device Tools)
- Integrated web browser for local programming from an intuitive web-based interface
- Two discrete inputs for backup level override and pump interlock functions
- Echo profile and trend views from the local display
- Patented digital receiver for improved performance in electrically noisy applications (close proximity to VSDs)
- Real time clock with daylight savings time supporting an integrated datalogger and energy saving algorithms for minimizing pump operation during high cost energy periods
- Removable terminal blocks for ease of wiring

Models

The SITRANS LUT400 comes in three different models, depending on the application, level of performance and functionality required:

- SITRANS LUT420 Level Controller - Level or volume measurement, basic pump control functions, and basic data logging capability
- SITRANS LUT430 Pump and Flow Controller - Full suite of advanced control functionality, open channel flow monitoring, and basic data logging capability
- SITRANS LUT440 High Accuracy OCM - Best performance (rated at 1 mm accuracy up to 3 meters), full suite of advanced control functionality, and enhanced data logging capability

Applications

- Liquids, solids and slurry monitoring in small to large process and storage vessels or outdoor applications (open air)
- Environmental, Mining/Aggregates/Cement, Food & Beverage, and Chemical market applications primarily
- Key sample applications include: wet wells, reservoirs, flumes/weirs, chemical storage, liquid storage, hoppers, crusher bins, dry solids storage

Approvals and Certificates

The SITRANS LUT400 is available with General Purpose and Hazardous Area approvals. It also has a number of approvals for specialized applications. For details, see chart below.

Note: The device nameplate lists the approvals that apply to your device.

Application Type		Approval Rating	Valid for:
Non-hazardous	General Purpose	CSA _{US/C} , CE, FM, UL listed, C-TICK	N. America, Europe, Australia
Hazardous	Non-incendive	CSA Class I, Div. 2, Groups A, B, C, D; Class II, Div 2, Groups F, G; Class III ^a	Canada

^a. Not available for devices with remote display.



ENM-10 level regulator

Density g/cm ³	Regulator length mm (in.)	Diameter mm (in.)
1.40 - 1.50	126 (5)	100 (4)

Weight

A regulator with standard density and 20 m cable weighs approximately 2 kg (4.5 lb).

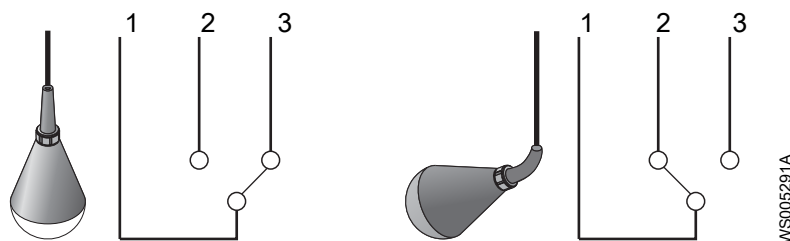
1.3 Cables

Lengths

For liquids with specific density between 0.95 and 1.10 g/cm³, the following cables are available:

Version	Lengths m (ft)
Standard	• 6 m (20 ft) • 13 m (42 ft) • 20 m (65 ft) • 30 m (100 ft) • 50 m (167 ft)
Ex-version	• 6 m (20 ft) • 13 m (42 ft) • 20 m (65 ft)

Color codes



Cable	1	2	3
Color	EU: Grey US: Red	Black	EU: Brown US: White

1.4 Approvals and standards

Standard approvals

LVD approval according to EN61058
 CSA approval: Certificate Number 1330172
 Cl. I Zone 0, Gr. IIC
 CL.I Div.1 Gr A, B, C and D
 Cl.II Gr. E, F, and G

Ex approvals

IECEX ia IIC T4 Ga: -20°C ≤ Ta ≤ 60°C
 IECEX NEMKO 09.008
 ATEX II 1G Ex ia IIC T4
 NEMKO 10 ATEX 1082

Applied standards for ATEX and IEC

- EN 60079-0:2012/IEC 60079-0:2011
- EN 60079-11:2012/IEC 60079-11:2011

Intrinsically safe circuits are required for the automatic control system. Use a Zener barrier. For example, part number 84 01 07.

The electrical connections must comply with the Ex regulations of the national submitter.



2 References

2.1 Chemical resistance tables

The tables show the degree of resistance the level regulator has to different chemicals at two different temperatures. The density of the liquid determines the buoyancy of the regulator.

Acids

Acid	PVC cable		NBR/PVC cable	
	20°C (68°F)	60°C (140°F)	20°C (68°F)	60°C (140°F)
Acetic acid 50%	1	2	0	0
Acetic acid 75%	2	2	0	0
Benzoic acid	2	2	0	0
Boric acid 5%	0	–	0	0
Butyric acid	2	2	2	2
Chromic acid 10%	0	2	2	2
Citric acid	0	1	0	0
Hydrobromic acid 5%	1	2	0	0
Hydrochloric acid 10%	0	1	0	1
Hydrochloric acid 37%	1	2	0	2
Hydrocyanic acid 10%	0	0	1	2
Hydrofluoric acid 5%	0	2	0	1
Hypochloric acid	1	2	2	2
Maleic acid	2	2	2	2
Nitric acid 5%	1	1	1	1
Nitric acid 65%	2	2	2	2
Oleic acid	1	2	2	2
Oxalic acid 50%	1	1	1	2
Phosphoric acid 25%	0	0	1	2
Phosphoric acid 85%	0	0	1	2
Sulphuric acid 10%	1	2	1	2
Sulphuric acid 78%	2	2	2	2
Tannic acid	0	0	0	0
Tartaric acid	1	1	1	1

0 = No effect. 1 = Minor to moderate effect. 2 = Severe effect. – = No available information.

Alkalis

Alkali	PVC cable		NBR/PVC cable	
	20°C (68°F)	60°C (140°F)	20°C (68°F)	60°C (140°F)
Ammonium hydroxide	0	–	0	0
Calcium hydroxide	0	0	0	0

Alkali	PVC cable		NBR/PVC cable	
	20°C (68°F)	60°C (140°F)	20°C (68°F)	60°C (140°F)
Potassium hydroxide	1	2	0	0
Sodium hydroxide	1	2	0	0

0 = No effect. 1 = Minor to moderate effect. 2 = Severe effect. – = No available information.

Salts

Salt	PVC cable		NBR/PVC cable	
	20°C (68°F)	60°C (140°F)	20°C (68°F)	60°C (140°F)
Aluminum chloride	0	0	0	0
Calcium sulphate	0	0	0	0
Calcium chloride	0	0	0	0
Calcium nitrate	0	0	0	0
Copper chloride	0	0	0	0
Copper sulphate	0	0	0	0
Ferric chloride	0	0	0	0
Ferrous sulphate	0	0	0	0
Magnesium chloride	0	0	0	0
Potassium sulphate	0	0	0	0
Potassium nitrate	0	0	0	0
Potassium carbonate	1	1	1	1
Potassium bicarbonate	0	0	0	0
Sodium sulphate	0	0	0	0
Sodium chloride	0	0	0	0
Sodium nitrate	0	0	0	0
Sodium bicarbonate	0	0	0	0
Sodium carbonate	0	0	0	0
Tin chloride	1	1	1	1
Zinc sulphate	0	0	0	0
Zinc chloride	0	0	0	0

0 = No effect. 1 = Minor to moderate effect. 2 = Severe effect. – = No available information.

Oils

Oil	PVC cable		NBR/PVC cable	
	20°C (68°F)	60°C (140°F)	20°C (68°F)	60°C (140°F)
Castor oil	1	1	1	1
Coconut oil	0	–	0	2
Corn oil	2	2	2	2
Diesel oil	2	2	2	2
Linseed oil	2	2	2	2
Mineral oils	2	2	2	2
Olive oil	1	1	1	1
Silicone oils	0	0	0	0

Ductile Iron Metal Faced Gate Valve Bs 5163 Series B + En1171:2002 Wras Approved Epoxy Coated.

Fig. B01



FLANGES TO EN 1092-2: 1997 PN 16

Use:

Potable, Waste Water, Sewage

Tests:

Seat: 1.1 x PN

Body: 1.5 x PN

Temperature range -10°C to 70°C (Insulate at 0°C and below)

Accessories:

Cap top

Actuator mounting ISO Flange

Anti-clockwise close

Chainwheel

PN25 Version

Extension Spindle

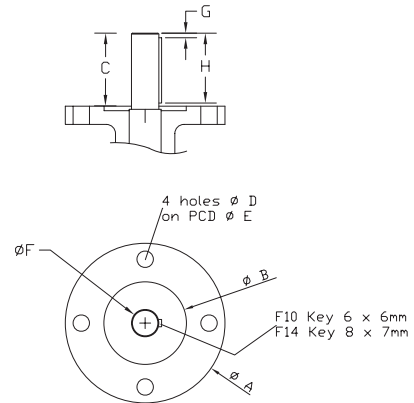
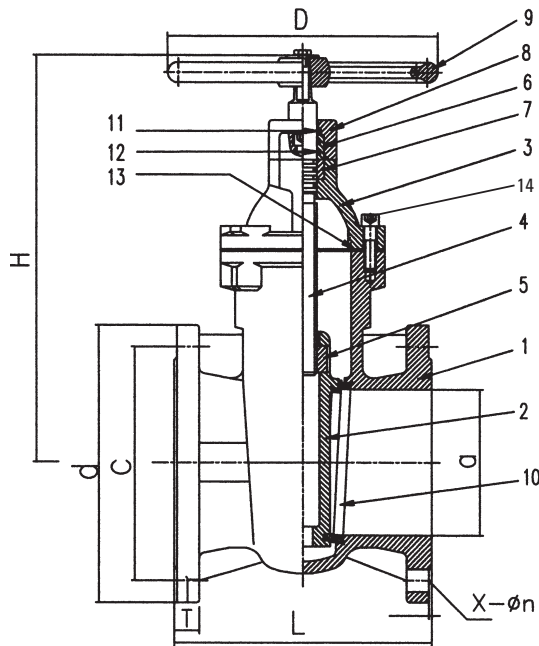
Locking Device

Materials:

1 Body	Ductile iron	EN-GJS-500-7
2 Wedge	Ductile iron	EN-GJS-500-7
3 Bonnet	Ductile iron	EN-GJS-500-7
4 Stem	Stainless steel	431S29
5 Stem nut	Bronze	BSEN 1982 CC491K
6 Sealing ring	Bronze	BSEN 1982 CC491K
7 Holding ring	Bronze	BSEN 1982 CC491K
8 Bonnet gland	Ductile iron	EN-GJS-500-7
9 Handwheel	Cast iron	BSEN GJL 200
10 Seat ring	Gunmetal	BSEN 1982 CC491K
11 Wiper ring	EPDM rubber	
12 Stem seals	EPDM rubber	
13 Bonnet gasket	EPDM rubber	
14 Bolting	Stainless steel GR 304	

Note: Actuators should be fitted with the valve stem in the vertical position

Ductile Iron Metal Faced Gate Valve Bs 5163 Series B



Valve dia	Dimensions							
	A	B	C	D	E	F	G	H
80	125	70.5	51	12	102	20	5	45
100								
150								
200	175	100.5	51	18	140	30	5	45
250								
300								

dimensions are to ISO 5210/3 1982
80 to 150mm are F10 type B3
200 to 300mm are F14 type B3

Adaption for actuator mounting

Dimensions: mm

Dia	a	C	d	T	f	L	x-n	D	H	Weight
50	50	125	165	19	3	178	4-Ø19	180	272	18 KG
65	65	145	185	19	3	190	4-Ø19	180	308	19 KG
80	80	160	200	19	3	203	8-Ø19	204	345	26 KG
100	100	180	220	19	3	229	8-Ø23	204	370	31 KG
150	150	240	285	19	3	267	8-Ø23	280	490	58 KG
200	200	295	340	20	3	292	12-Ø23	320	570	87 KG
250	250	355	405	22	3	330	12-Ø28	360	675	131 KG
300	300	410	460	24.5	4	356	12-Ø28	450	780	188 KG

Size	Torque (N.m.)	No of turns
50mm/2"	-	15.5
65mm/2.5	-	15.5
80mm/3"	50	8
100mm/4"	60	9.5
125mm/5"	-	12
150mm/6"	100	14
200mm/8"	150	18.5
250mm/10"	265	22
300mm/12"	380	27

Operating torque at 16 barg with no safety.

Ductile Iron Check Valve EN12 334:2001

SUPERCEDES BS 5153

Fig. C01, C02



C01



C02

Flanges To EN 1092-2: 1997 PN16

Use:

Potable Water
Waste Water
Sewage

Tests:

Seat: 1.1 x PN
Body: 1.5 x PN
Temperature range: -10°C to 70°C
(Insulate at 0°C and below)

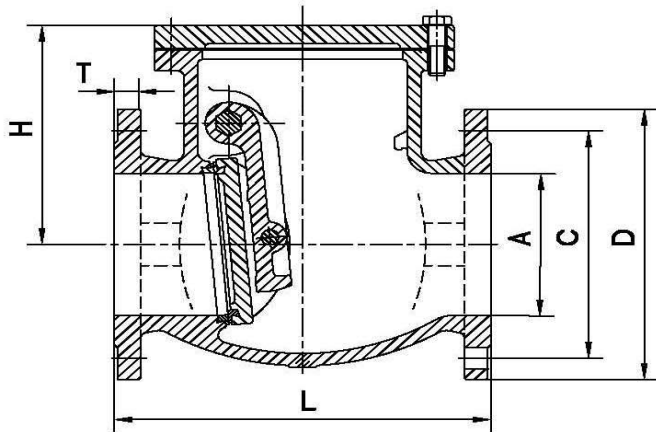
Accessories:

Lever & Weight
Proximity Switch
Guard - Coated
1/2" BSP Air Release on cover as standard.

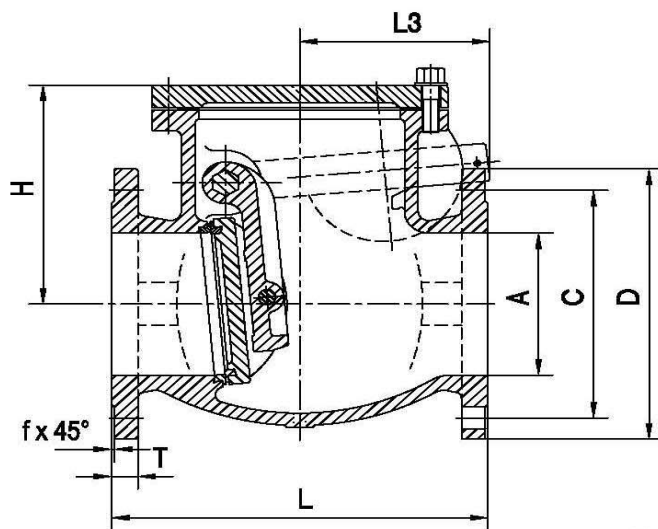
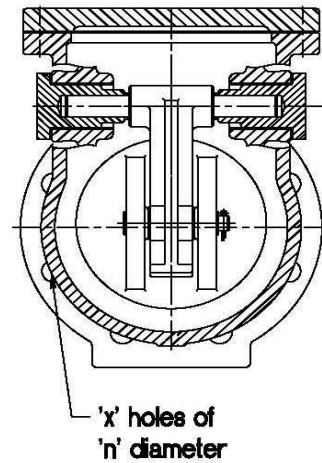
Materials:

1	Body	Ductile Iron	BSEN 500 7
2	Body Seat Ring	Bronze	BSEN 1982 CC 491K
3	Disc Seat Ring	Bronze	BSEN 1982 CC 491K
4	Disc	Ductile Iron	BSEN 500 7
5	Hinge	DN50-150 BS1400 LG2	DN200-400 BS1452 Gr 220
6	Shaft	Stainless Steel	431S29
7	Cover	Ductile Iron	BSEN 500 7
8	Disc Pin	Stainless Steel	431S29
9	Bearing	Bronze	BSEN 1982 CC 491K
10	Bolting	Stainless Steel	GR304
11	Lever	Steel	
12	Seals	EPDM rubber	Commercial
13	Bonnet Gasket	EPDM rubber	Commercial

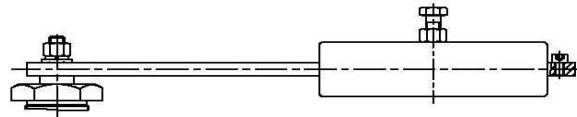
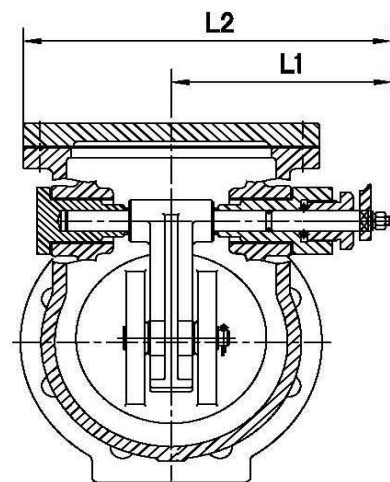
Ductile Iron Seated Check Valve EN12 334:2001



STANDARD VALVE FIGURE C01



LEVER & WEIGHT VALVE FIGURE C02



Dimensions in millimetres

size	A	C	D	T	F	L	x-n	H	L1	L2	L3	kgs CO1	Kgs CO2
50	50	125	165	20	3	203	4-Ø19	135	127	210	110	14.5	15
65	65	145	185	20	3	216	4-Ø19	148	130	220	105	17.5	18.5
80	80	160	200	22	3	241	8-Ø19	178	160	265	120	26	28
100	100	180	220	24	3	292	8-Ø19	195	170	280	148	31.5	34
125	125	210	250	26	3	330	8-Ø19	210	201	335	148	49	56
150	150	240	285	26	3	356	8-Ø23	250	220	366	175	68	77
200	200	295	340	30	3	495	12-Ø23	300	260	395	245	117	129
250	250	355	405	32	3	622	12-Ø27	335	305	520	285	173	189
300	300	410	460	32	4	698	12-Ø27	365	345	597	325	264	284
350	350	470	520	36	4	787	16-Ø27	415	425	730	350	Consult Supplier	
400	400	525	580	38	4	914	16-Ø31	455	450	792	350		

Carbon Steel Spring Check Valve - Wafer Type

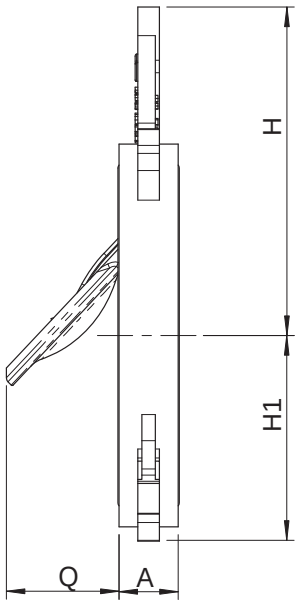
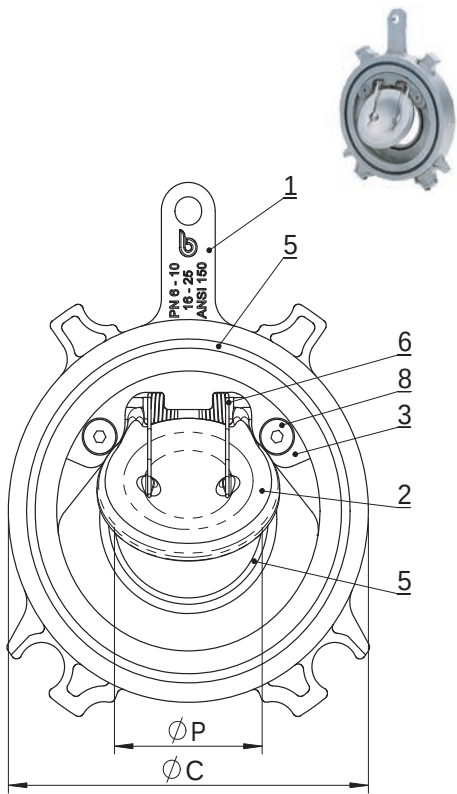
To Fit PN6/10/16/25 & ANSI 150, Carbon Steel Body & Disc,
302 Stainless Steel Spring. Note: NBR Seat as standard, other options
available via assembly. Can be used without spring.

Pressure / Temperature Specifications	
Pressure	PN25 2" to 8"
	PN16 10"
Temperature	NBR -10°C to 100°C (110°C Peak)
	Viton -10°C to 150°C (170°C Peak)
	PTFE -10°C to 200°C

Valve Material Specifications	
1. Body	ASTM A216 Gr. WCB Carbon Steel
2. Disc	ASTM A216 Gr. WCB Carbon Steel
3. Plate	ASTM A351 Gr. CF8M Stainless Steel
5. O-ring	EPDM (Viton & PTFE options)
6. Spring	AISI 302 Stainless Steel
8. Screw	A2 Stainless Steel

Dimensions							
DN	P	A	C	H	H1	Q	Kg
2"	33	18.5	99	98.5	53	36	0.82
2½"	43	18.5	118	107	63	49	1.25
3"	53	22	134	115	73	58	1.86
4"	75	23.5	154	131	92	77	2.42
5"	96	29	184	138	119	95	3.1
6"	118	34.5	208	137	149	117	5.3
8"	164	36	264	169	167	151	8.5
10"	200	38	317	247	140	183	12.4

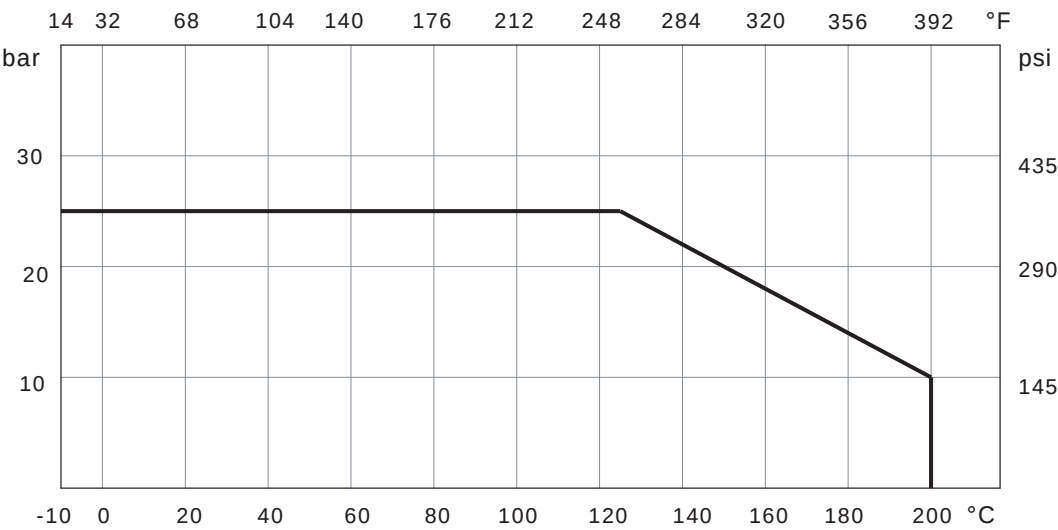
KV / Cracking Pressure Information				
		Spring Information / Flow Direction / Cracking Pressures (mmH ₂ O)		
Size	Kv	With Spring ↑	With Spring →	Without Spring ↑
2"	41	194	126	70
2½"	75	198	130	70
3"	140	196	120	76
4"	208	174	106	68
5"	341	226	126	100
6"	525	230	130	100
8"	1093	244	136	110
10"	1670	260	138	122



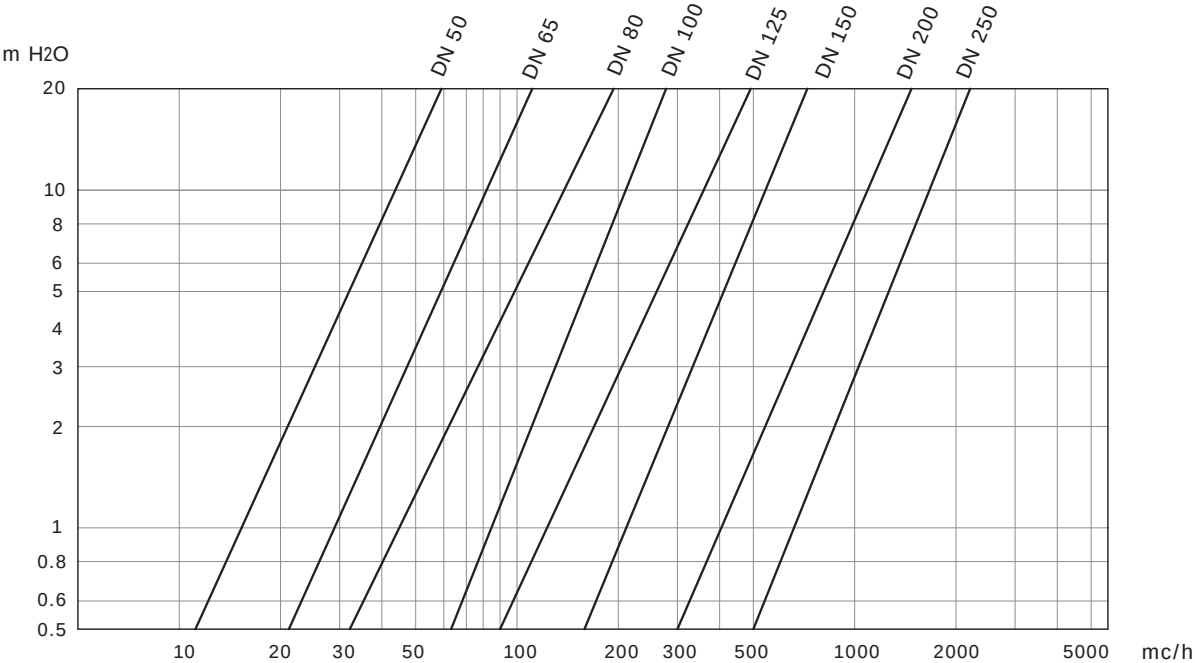
Continues on Page 2

Carbon Steel Spring Check Valve - Wafer Type

Pressure / Temperature Chart (Note: Maximum temperature depends on O-ring material)



Head Loss Chart (Fluid: Water - 1m H₂O = 0.098 Bar)

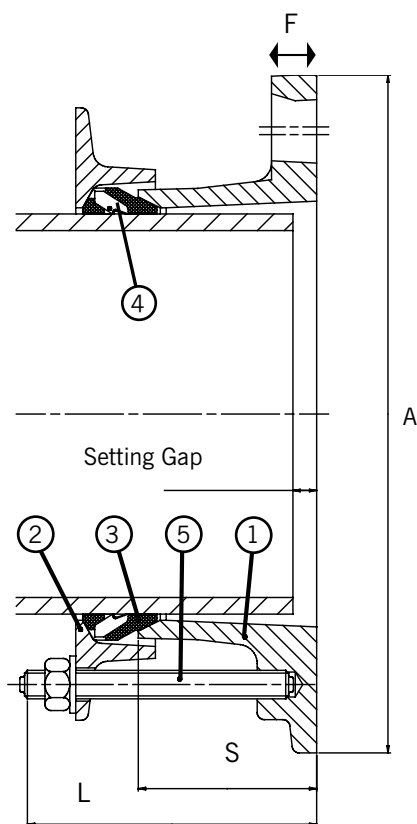


FlexLock Flange Adaptors

Datasheet

1/2

Flange Adaptor



Key

- 1 = Flange Adaptor
- 2 = End Ring
- 3 = Gasket
- 4 = Gasket Gripper Teeth
- 5 = Stud

FlexLock Flange Adaptors

Pipe Nom	Pipe OD (mm)	Pipe Material	Bolt Size No.-Dia x Length	Flange OD (A)	Overall Length (L)	Flange Thickness (mm) (F)	Sleeve Length (mm) (S)	Flange Nominal Drilling BS EN 1092-1	Working Pressure (bar)		Setting Gap		Gasket Mould	FA Weight (kg)
									Water	Gas	Min	Max		
DN50/2"	60.3	Steel	2-M12 x 115	160	123	16	75	50 PN10/16	16	6	10	30	1375	2.3
DN65/2.5"	76.1	Steel	2-M12 x 115	180	123	16	75	60/65 PN10/16	16	6	10	30	1394	2.6
DN80/3"	88.9	Steel	4-M12 x 115	195	123	16	75	80 PN10/16 90 PN6	16	6	10	30	1382	3.4
DN80/3"	98	Ductile Iron	4-M12 x 115	195	123	16	75	80 PN10/16 90 PN6	16	6	10	30	1630	4.0
DN100/4"	114.3	Steel	4-M12 x 115	215	123	16	75	100 PN10/16 110 PN6	16	6	10	30	1367	4.5
DN100/4"	118	Ductile Iron	4-M12 x 115	215	123	16	75	100 PN10/16	16	6	10	30	1618	4.4
DN150/6"	165.1	Steel	8-M12 x 115	285	127	25	75	150 PN10/16 6"E 6"ANSI 150	16	6	10	30	1369	9.3
DN150/6"	168.3	Steel	8-M12 x 115	286	123	19	75	150 PN10/16	16	6	10	30	1369	8.0
DN150/6"	170	Ductile Iron	8-M12 x 115	286	123	19	75	150 PN10/16	16	6	10	30	1369	8.0
DN200/8"	219.1	Steel	8-M12 x 115	341	123	19	75	200 PN10	10	6	10	30	1370	9.7
DN200/8"	219.1	Steel	8-M12 x 115	340	127	25	73	200 PN16	16	6	10	30	1370	15.2
DN200/8"	222	Ductile Iron	6-M16 x 125	341	137	19	75	200 PN16	16	6	10	30	1631	10.6
DN200/8"	222	Ductile Iron	8-M16 x 125	340	137	25	75	200 PN10 8"E	10	6	10	30	1631	13.9
DN250/10"	273.0	Steel	12-M16 x 125	405	137	19	90	250 PN10/16*	10	6	10	30	1737	16.4
DN250/10"	274	Ductile Iron	12-M16 x 125	405	137	19	90	250 PN10/16*	10	6	10	30	1737	16.4
DN300/12"	323.9	Steel	12-M16 x 125	467	137	19	90	300 PN10/16*	10	6	10	30	7667/8	22.7
DN300/12"	326	Ductile Iron	12-M16 x 125	467	137	19	90	300 PN10/16*	10	6	10	30	7667/8	22.7

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Technical Information

Working Pressure Rating

Water:

- DN50 to DN200 = 16 bar
- DN250 to DN300 = 10 bar

Gas:

- DN50 to DN300 = 6 bar

Vacuum Pressure

Capable of accommodating a vacuum pressure of -0.7 bar

Site Test Pressure

1.5 times working pressure for short duration (2 hours)

Flange Drilling

While DN250 to DN300 are supplied with PN1616 drilling the rated working pressure (water) is only 10 bar as stated in the table.

Angularity

Flange Adaptors 3°

Bolt Torque/Spanner

M12; Torque 55-65Nm on every bolt

M16; Torque 95-120Nm on every bolt

Temperature Rating of Product

EPDM -20°C to +40°C

Nitrile -20°C to +40°C

Materials & Relevant Standards

End Rings Options:

- SG. Iron to BS 1563: Symbol EN-GJS-450-10
- Rolled Steel to: BS EN 10025: Grade S275

Flange Adaptor Body Options:

- Ductile Iron to BS EN 1563 EN-GJS-450-10
- Mild Steel to: BS EN 10025: Grade S275

Gasket

EPDM compound Grade E to BS EN 681-1

Nitrile compound Grade 'G' to BS EN 682-1

Gasket Gripper Teeth

Stainless Steel BS 3146: Part 2 Grade ANC2

General Notes

- FlexLock is only suitable for use on Ductile Iron, Steel and Coated Steel Pipe
- For coated steel pipe the maximum permitted coating thickness is 500µ DFT. This is to ensure the stainless steel teeth properly grip onto the pipe surface to mobilize the end load capability of the products.
- Due to the surface characteristics of stainless steel pipe, FlexLock grippers are unable to achieve a guaranteed grip on the pipe surface.
- If the product has to be dismantled after installation then for reassembly a new gasket must be used, as there is a risk that the stainless steel teeth may become dislodged during this operation. These are available as spares from Viking Johnson by quoting gasket mould number from the table along with gasket compound.

Approvals

The following water contact materials used in FlexLock are approved for use with potable water:-

Rilsan Nylon 11:

- WRAS, AS/NZS 4020, DVGW, W270, ACS & KIWA

EPDM Gaskets:

- WRAS, AS/NZS 4020

In addition to the above, FlexLock range as a finished product has KIWA certification verifying that the above products comply with the requirements of the Water Supply (Water Fittings) Regulations for England and Wales 1999, the Water Byelaws 2000, Scotland and the Water Regulations Northern Ireland.

Coatings

Body, Centre Sleeve, & End Rings:

- Rilsan Nylon 11 to WIS 4-52-01 Part 1

Studs & Nuts:

- Sheraplex coated to WIS 4-52-03

Studs

Cold Forged Steel Fasteners to: BS EN ISO898-1: Property Class 8.8

Nuts

Steel BS EN 20898-2: Property Class 8

Washers

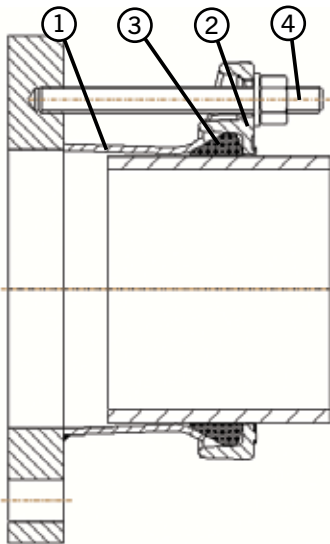
BS 4320 Form B Stainless Steel BS 1449:PT2: Grade 304 S15

QuickFit Flange Adaptors - Fabricated (Standard Drillings)

Datasheet

1/4

Flange Adaptor



Key

- 1 = Body
- 2 = End Ring
- 3 = Gasket
- 5 = Studs

Fabricated QuickFit Flange Adaptors - Standard Drillings Available

OD	Flange Details Nom (mm)	BS EN 1092											
		PN2.5		PN6		PN10		PN16		PN25		PN40	
		Y/N	Tied?	Y/N	Tied?	Y/N	Tied?	Y/N	Tied?	Y/N	Tied?	Y/N	Tied?
059.5 - 063.3	50	✓	X	✓	X								
075.3 - 079.1	65	✓	X	✓	X					✓	✓	✓	✓
088.1 - 091.9	80	✓	X	✓	X								
095.8 - 100.2	80	✓	X	✓	X								
107.2 - 111.0	100	✓	✓	✓	✓					✓	✓	✓	✓
113.5 - 120.2	100	✓	X	✓	X					✓	✓	✓	✓
138.9 - 142.7	125	✓	X	✓	X					✓	✓	✓	✓
158.2 - 162.0	150	✓	X	✓	X					✓	✓	X	X
167.5 - 172.3	150	✓	X	✓	X					✓	✓	X	X
192.2 - 196.7	200	✓	✓	✓	✓					✓	✓	X	X
218.3 - 224.4	200	✓	X	✓	X					✓	✓	X	X
272.2 - 276.5	250	✓	X	✓	X					✓	✓	X	X
323.1 - 328.6	300	✓	X	✓	X					X	X	X	X

Y/N = ✓ = Can make QFFA with this drilling

X = Cannot make QFFA with this drilling

Tied? = ✓ = Can offer as tied FA – notching not required

X = Cannot offer as tied FA – bolts clash with end ring – cannot notch

Denotes standard cast product

OD	Flange Details Nom (")	BS 10:1962 Table											
		A		D		E		F		H		J	
		Y/N	Tied?	Y/N	Tied?	Y/N	Tied?	Y/N	Tied?	Y/N	Tied?	Y/N	Tied?
059.5 - 063.3	2	✓	X	✓	X	✓	X	✓	✓	✓	✓	X	X
075.3 - 079.1	2.5	✓	X	✓	X	✓	X	✓	✓	✓	✓	X	X
088.1 - 091.9	3	✓	X	✓	X	✓	X	✓	✓	✓	✓	X	X
095.8 - 100.2	3	✓	X	✓	X	✓	X	✓	✓	✓	✓	X	X
107.2 - 111.0	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	X
113.5 - 120.2	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	X
138.9 - 142.7	5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	X
158.2 - 162.0	6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	X
167.5 - 172.3	6	✓	X	✓	X	✓	X	✓	✓	✓	✓	X	X
192.2 - 196.7	8	✓	✓	✓	✓	✓	✓	✓	✓	X	X	X	X
218.3 - 224.4	8	✓	✓	✓	✓	✓	X	✓	✓	✓	✓	X	X
272.2 - 276.5	10	X	X	X	X	✓	✓	✓	✓	✓	✓	X	X
323.1 - 328.6	12	X	X	✓	✓	✓	✓	X	X	X	X	X	X

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QuickFit Flange Adaptors - Fabricated (Standard Drillings)

Datasheet

2/4

Technical Information

Working Pressure Rating

Water working pressure in accordance with the flange rating
Gas 6 bar

Vacuum Pressure

Capable of accommodating a vacuum pressure of -0.7 bar

Site Test Pressure

1.5 times working pressure for short duration (2 hours)

Angularity

Flange Adaptor 3°

Bolt Torque/Spanner

M12; Torque 55-65Nm on every bolt
Spanner size A/F 19mm

Temperature Rating of Product

EPDM -20°C to +90°C

Nitrile -20°C to +90°C

For use on applications with fluctuating and / or elevated temperatures (> 60°C) may require regular maintenance to re-tighten the bolts and must be included in any maintenance schedule.

Approvals

The following water contact materials used in QuickFit are approved for use with potable water:-

Rilsan Nylon 11:

➤ WRAS, AS/NZS 4020, DVGW, W270, ACS & KIWA

EPDM Gaskets:

➤ WRAS, AS/NZS 4020

Materials & Relevant Standards

Flange

Steel to BS EN 10025-2: Grade S275JR

Sleeve Options:

- Steel Tube to BS EN 10216-1: Grade P265TRI
- Steel Tube to BS EN 10217-1:
- Steel BS EN10025-2: Grade S275JR

End Rings

Ductile Iron to BS EN1563: Symbol EN GJS-450-10

Gaskets

EPDM to BS EN681-1, TYPE WA, WC

Nitrile to BS EN682:Type G

Other grades are available - contact Viking Johnson for details

Tee Bolts/Bolts

Standard - Steel to BS EN ISO 898-1: property class 4.8

Option - Stainless Steel to BS EN ISO 3506-1:
grade A4 property class 50

Nuts

Steel to BS EN 20898-2: property class 8

Option - Stainless Steel to BS EN ISO 3506-2:
grade A4 property class 80

Washers

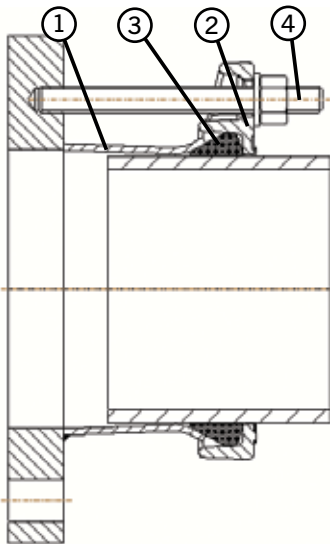
Stainless Steel to BS1449:PART 2: GRADE 304S15

QuickFit Flange Adaptors - Fabricated (Standard Drillings)

Datasheet

3/4

Flange Adaptor



Key

- 1 = Body
- 2 = End Ring
- 3 = Gasket
- 5 = Studs

Fabricated QuickFit Flange Adaptors - Standard Drillings Available

Y/N = ✓ = Can make QFFA with this drilling

x = Cannot make QFFA with this drilling

Tied? = ✓ = Can offer as tied FA – notching not required

x = Cannot offer as tied FA – bolts clash with end ring – cannot notch

OD	Flange Details Nom - (")	ASME/ANSI B16.1/ASME B16.5 Class							
		125		150		250		300	
		Y/N	Tied?	Y/N	Tied?	Y/N	Tied?	Y/N	Tied?
059.5 - 063.3	2	✓	x	✓	x	✓	✓	x	x
075.3 - 079.1	2.5	✓	✓	✓	✓	✓	✓	x	x
088.1 - 091.9	3	✓	✓	✓	✓	✓	✓	x	x
095.8 - 100.2	3	✓	x	✓	x	✓	✓	x	x
107.2 - 111.0	4	✓	✓	✓	✓	✓	✓	x	x
113.5 - 120.2	4	✓	✓	✓	✓	✓	✓	x	x
138.9 - 142.7	5	✓	✓	✓	✓	✓	✓	x	x
158.2 - 162.0	6	✓	✓	✓	✓	✓	✓	x	x
167.5 - 172.3	6	✓	✓	✓	✓	✓	✓	x	x
192.2 - 196.7	8	✓	✓	✓	✓	x	x	x	x
218.3 - 224.4	8	✓	✓	✓	✓	✓	✓	x	x
272.2 - 276.5	10	✓	✓	✓	✓	x	x	x	x
323.1 - 328.6	12	✓	✓	✓	✓	x	x	x	x

OD	Flange Details Nom - (")	AWWA C207 Class							
		B		D		E		F	
		Y/N	Tied?	Y/N	Tied?	Y/N	Tied?	Y/N	Tied?
107.2 - 111.0	4	✓	✓	✓	✓	✓	✓	✓	✓
113.5 - 120.2	4	✓	✓	✓	✓	✓	✓	✓	✓
138.9 - 142.7	5	✓	✓	✓	✓	✓	✓	✓	✓
158.2 - 162.0	6	✓	✓	✓	✓	✓	✓	✓	✓
167.5 - 172.3	6	✓	✓	✓	✓	✓	✓	✓	✓
192.2 - 196.7	8	✓	✓	✓	✓	✓	✓	✓	✓
218.3 - 224.4	8	✓	✓	✓	✓	✓	✓	✓	✓
272.2 - 276.5	10	✓	✓	✓	✓	✓	✓	x	x
323.1 - 328.6	12	✓	✓	✓	✓	✓	✓	x	x

OD	Flange Details Nom - (mm)	AS2129 Table							
		A		C		D		E	
		Y/N	Tied?	Y/N	Tied?	Y/N	Tied?	Y/N	Tied?
059.5 - 063.3	50	✓	x	✓	x	✓	x	✓	x
075.3 - 079.1	65	✓	x	✓	x	✓	x	✓	x
088.1 - 091.9	80	✓	x	✓	x	✓	x	✓	x
095.8 - 100.2	80	✓	x	✓	x	✓	x	✓	x
107.2 - 111.0	100	✓	✓	✓	✓	✓	✓	✓	✓
113.5 - 120.2	100	✓	x	✓	x	✓	x	✓	x
138.9 - 142.7	125	✓	✓	✓	✓	✓	✓	✓	✓
158.2 - 162.0	150	✓	✓	✓	✓	✓	✓	✓	✓
167.5 - 172.3	150	✓	x	✓	x	✓	x	✓	x
192.2 - 196.7	200	✓	✓	✓	✓	✓	✓	✓	✓
218.3 - 224.4	200	✓	x	✓	x	✓	x	✓	x
272.2 - 276.5	250	x	x	x	x	x	x	✓	✓
323.1 - 328.6	300	x	x	✓	✓	✓	✓	✓	x

Every effort has been made to ensure that the information contained in this publication is accurate at the time of publishing. Crane Ltd assumes no responsibility or liability for typographical errors or omissions or for any misinterpretation of the information within the publication and reserves the right to change without notice.

DR0550_03_2020_ISSUE 6

QuickFit Flange Adaptors - Fabricated (Standard Drillings)

Datasheet

4/4

Technical Information

Working Pressure Rating

Water working pressure in accordance with the flange rating
Gas 6 bar

Vacuum Pressure

Capable of accommodating a vacuum pressure of -0.7 bar

Site Test Pressure

1.5 times working pressure for short duration (2 hours)

Angularity

Flange Adaptor 3°

Bolt Torque/Spanner

M12; Torque 55-65Nm on every bolt
Spanner size A/F 19mm

Temperature Rating of Product

EPDM -20°C to +90°C

Nitrile -20°C to +90°C

For use on applications with fluctuating and / or elevated temperatures (> 60°C) may require regular maintenance to re-tighten the bolts and must be included in any maintenance schedule.

Approvals

The following water contact materials used in QuickFit are approved for use with potable water:-

Rilsan Nylon 11:

➤ WRAS, AS/NZS 4020, DVGW, W270, ACS & KIWA

EPDM Gaskets:

➤ WRAS, AS/NZS 4020

Materials & Relevant Standards

Flange

Steel to BS EN 10025-2: Grade S275JR

Sleeve Options:

- Steel Tube to BS EN 10216-1: Grade P265TRI
- Steel Tube to BS EN 10217-1:
- Steel BS EN10025-2: Grade S275JR

End Rings

Ductile Iron to BS EN1563: Symbol EN GJS-450-10

Gaskets

EPDM to BS EN681-1, TYPE WA, WC

Nitrile to BS EN682:Type G

Other grades are available - contact Viking Johnson for details

Tee Bolts/Bolts

Standard - Steel to BS EN ISO 898-1: property class 4.8

Option - Stainless Steel to BS EN ISO 3506-1:
grade A4 property class 50

Nuts

Steel to BS EN 20898-2: property class 8

Option - Stainless Steel to BS EN ISO 3506-2:
grade A4 property class 80

Washers

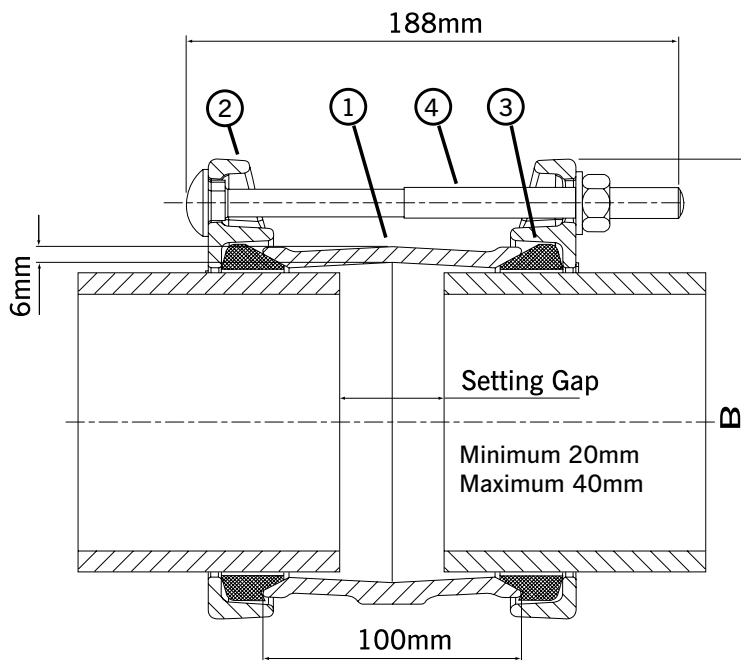
Stainless Steel to BS1449:PART 2: GRADE 304S15

QuickFit Couplings

Datasheet

1/2

Coupling



Key

- 1 = Centre Sleeve
- 2 = End Ring
- 3 = Gasket
- 5 = Bolts, Nut & Washer

QuickFit Couplings

Size Range (mm)		Working Pressure (bar)	End Ring OD B (mm)	Bolt Size No.-Dia x Length	Gasket Mould No.	Weight (kg)
Min	Max					
47.9	51.3	46.6	136.0	2-M12 x 180	12477/41	2.22
59.5	63.3	46.6	148.0	2-M12 x 180	12477/1	2.51
75.3	79.1	46.6	164.0	2-M12 x 180	12477/5	2.89
88.1	91.9	46.6	177.0	4-M12 x 180	12477/7	3.81
95.8	100.2	46.6	185.0	4-M12 x 180	12477/10	4.00
107.2	111.0	46.6	196.0	4-M12 x 180	12477/12	4.26
113.5	120.2	46.6	205.0	4-M12 x 180	12477/15	4.48
138.9	142.7	44	228.0	4-M12 x 180	12477/19	5.02
158.2	162.0	38.8	254.0	4-M12 x 180	12477/21	6.32
167.5	172.3	36.9	264.0	4-M12 x 180	12477/24	6.59
192.9	196.7	32.2	292.0	4-M12 x 180	12477/26	8.06
218.3	224.4	35.8	319.0	4-M12 x 180	12477/29	8.89
272.2	276.5	34.8	372.0	6-M12 x 180	12477/34	11.15
323.1	328.6	29.5	424.0	6-M12 x 180	12477/37	12.76

Every effort has been made to ensure that the information contained in this publication is accurate at the time of publishing. Crane Ltd assumes no responsibility or liability for typographical errors or omissions or for any misinterpretation of the information within the publication and reserves the right to change without notice.

DR8550_03_2020_ISSUE 6

Technical Information

Working Pressure Rating

For Water / Wastewater applications as detailed in QuickFit Coupling Technical Data Table.

Gas 6 bar

Vacuum Pressure

Capable of accommodating a vacuum pressure of -0.7 bar

Site Test Pressure

1.5 times working pressure for short duration (2 hours)

Angularity

Couplings 6°

Bolt Torque/Spanner

M12; Torque 55-65Nm on every bolt

Spanner size A/F 19mm

Temperature Rating of Product

EPDM -20°C to +90°C

Nitrile -20°C to +90°C

For use on applications with fluctuating and / or elevated temperatures (> 60°C) may require regular maintenance to re-tighten the bolts and must be included in any maintenance schedule.

End Load Due to Internal Pressure

QuickFit DOES NOT resist end load due to the internal pressure - adequate external restraint must be provided to prevent pipe pull out.

Approvals

The following water contact materials used in QuickFit are approved for use with potable water:-

Rilsan Nylon 11:

➤ WRAS, AS/NZS 4020, DVGW, W270, ACS & KIWA

EPDM Gaskets:

➤ WRAS, AS/NZS 4020

In addition to the above, QuickFit range as a finished product has KIWA certification verifying that the above products comply with the requirements of the Water Supply (Water Fittings) Regulations for England and Wales 1999, the Water Byelaws 2000, Scotland and the Water Regulations Northern Ireland.

Materials & Relevant Standards

Centre Sleeve & End Rings

Ductile Iron to BS EN1563: Symbol EN-GJS-450-10

Gaskets

EPDM to BS EN681-1, TYPE WA, WC

Nitrile to BS EN682:Type G

Other grades are available - contact Viking Johnson for details

Coatings

Centre Sleeve & End Rings:

➤ Rilsan Nylon 11 to WIS 4-52-01 Part 1

Other coatings available: Scotchkote, Galvanised

Tee bolts, CDX Bolts & Nuts:

➤ Sheraplex to WIS 4-52-03

Tee Bolts/Bolts

Standard - Steel to BS EN ISO 898-1: property class 4.8

Option - Stainless Steel to BS EN ISO 3506-1:
grade A4 property class 50

Nuts

Standard - Steel to BS EN 20898-2: property class 8

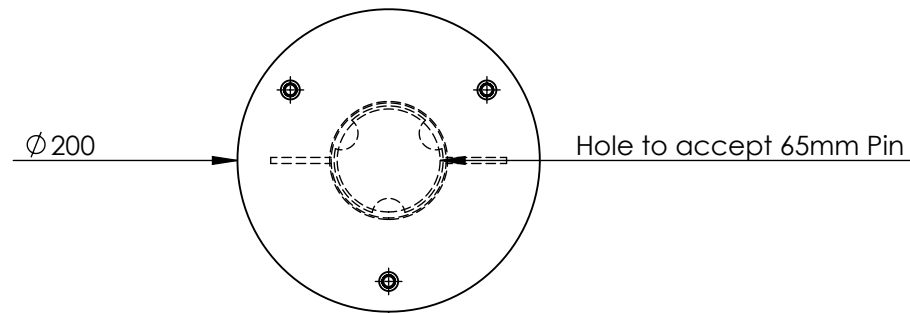
Option - Stainless Steel to BS EN ISO 3506-2:
grade A4 property class 80

Washers

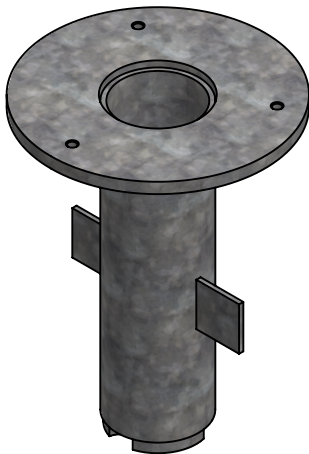
Stainless Steel to BS1449:PART 2: GRADE 304S15

"500kg WLL Flush Mounted Davit Socket"

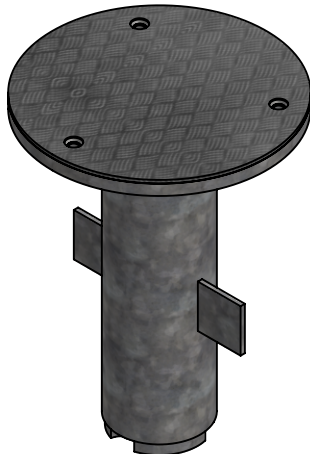
Finish Ref; Galvanised



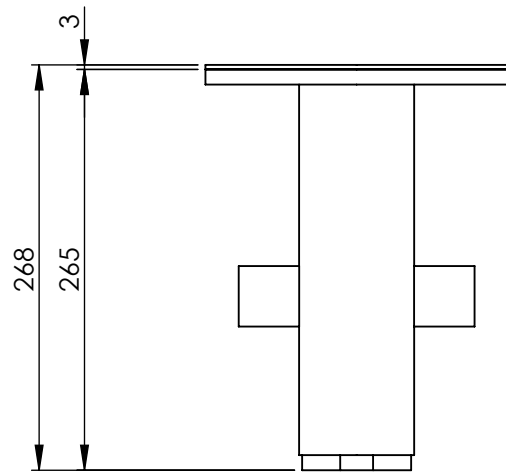
Plan View



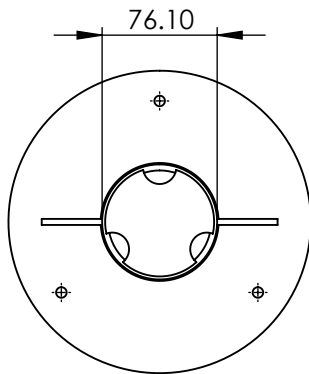
Isometric View
(Cover Plate Removed)



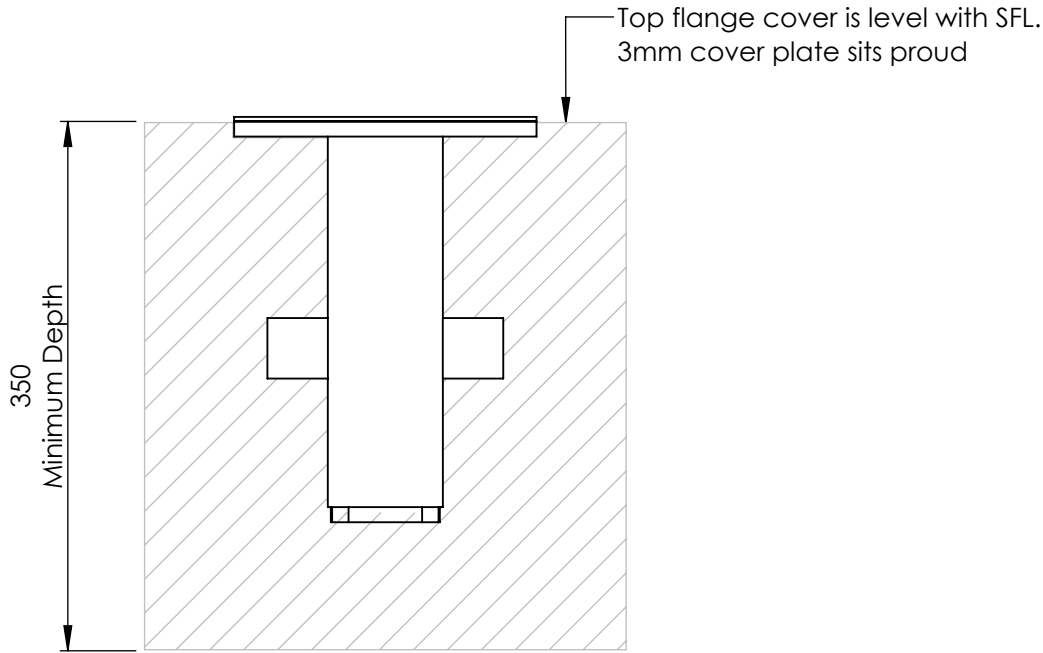
Isometric View



Front Elevation



Underside Elevation



General Notes / Revisions

Mild Steel construction with a galvanised finish to BSEN 1461

Supplied with cover plate

DRAWING APPROVAL

Drawing reviewed and approved ☐
Drawing reviewed with comments ☐
Drawing reviewed and rejected ☐

Name; _____

Signed; _____ Date; _____

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DO NOT SCALE OFF THIS DRAWING

Drawing No.	TAE-100-01		
Description	500kg WLL Davit Socket		
Revision	B		
Drawn By			
Scale	1:5 @ A3	Sheet	1 of 1
Date	02/03/2020		

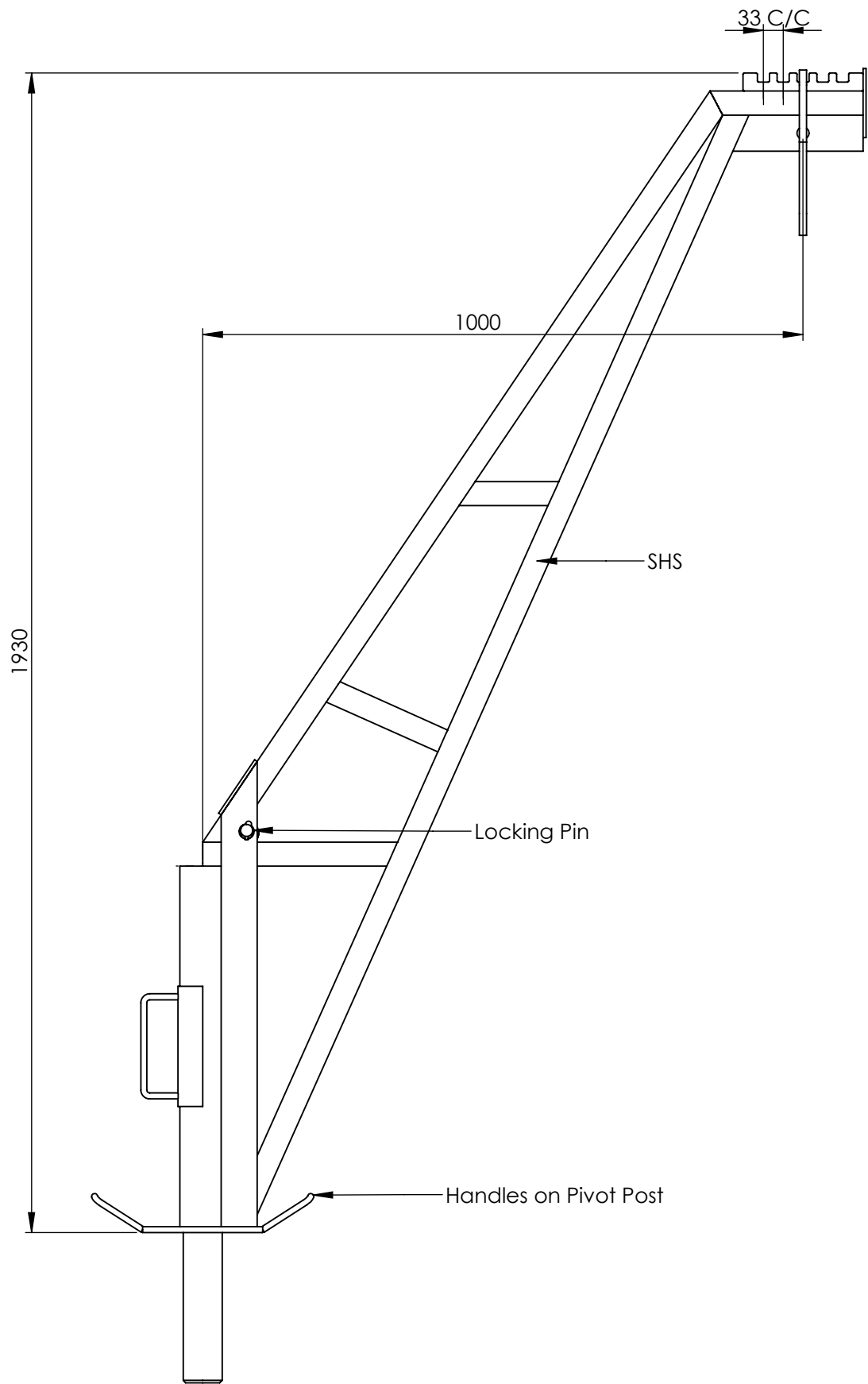


All Pump Solutions LLP
1 Ennerdale Road
Shrewsbury
SY1 3LD
T: 01743 465 463
E: Sales@allpumpsolutions.com
www.allpumpsolutions.com

"500KG WLL 1000mm Reach Lean Over Davit"

Finish Ref; Galvanised

Arm - 23kg, Intermediate Support - 24kg, Pin - 25kg



Front Elevation



Isometric View

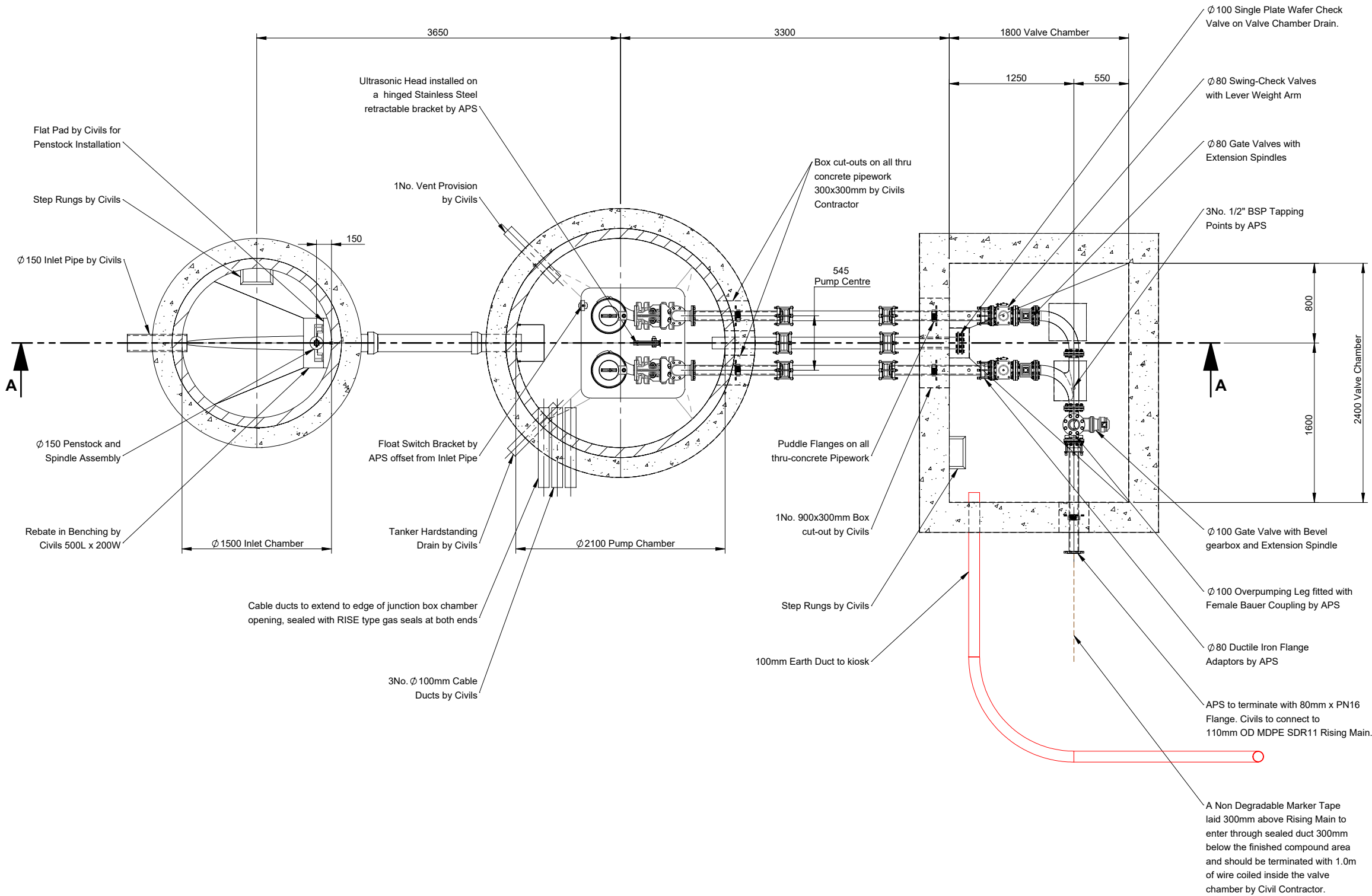
General Notes / Revisions

Drawing No.	TAE-201-01		
Description	500KG Davit		
Revision	A		
Drawn By	D.Johnson		
Scale	1:10 @ A3	Sheet	1 of 1
Date	13/03/2017		

APPENDIX D.

PUMP STATION DRAWINGS

SECTIONAL PLAN VIEW



Approved by:

Date:

Signed:

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Notes

1. All works to be carried out in accordance with Design and Construction Guidance as amended by the UU Addendum.
2. All Civils works to be completed by Civil contractor.
3. Box outs to be filled and made good by civil contractor once pipework has been installed.
4. All dimensions in mm unless otherwise stated.
5. Benching to be completed after APS installation.
6. Cable ducts to be installed by civil contractor complete with draw-cords. Specific sizes shown within drawing detail.
7. Cable ducts to be sealed with 'Rise' sealant by APS at kiosk and field ends only.
8. All structural calculations to be completed by structural engineer. APS have no involvement with the design of wet well cover and base slab.
9. Flow calculations based on 110mm OD MDPE SDR11 Rising Main.
10. Pumps are Non-EX rated as a result of the Atex risk assessment.
11. All Electrical Equipment is Non-EX rated as a result of the Atex risk assessment.
12. All fittings are to be stainless steel.
13. The pumps are to be labelled 'Pump1' & 'Pump2'.
14. All Equipment within wet well and valve chamber to be earth bonded by APS in accordance with Design and Construction Guidance as amended by the UU Addendum.
15. All fixing bolts into concrete to be stainless steel.

A	Drawing for Approval	08/06/2023	GR
Issue:	Description:	Date:	Auth:



Tel: 01743465463
Fax:01743452050
Email: sales@allpumpsolutions.com



FLUID EXPERTISE

Title: **Supply and Installation of all Pipework, Valves and Pump related fittings from the Inlet chamber into the Pumping Station, right through to the discharge from the valve chamber**
- Sectional Plan View

Contract: **Land edged red Hollingworth Road, Littleborough, Rochdale**

Contractor: **Countryside Partnership (Yorkshire)**

Consulting Engineer: **Eastwood & Partners Ltd**

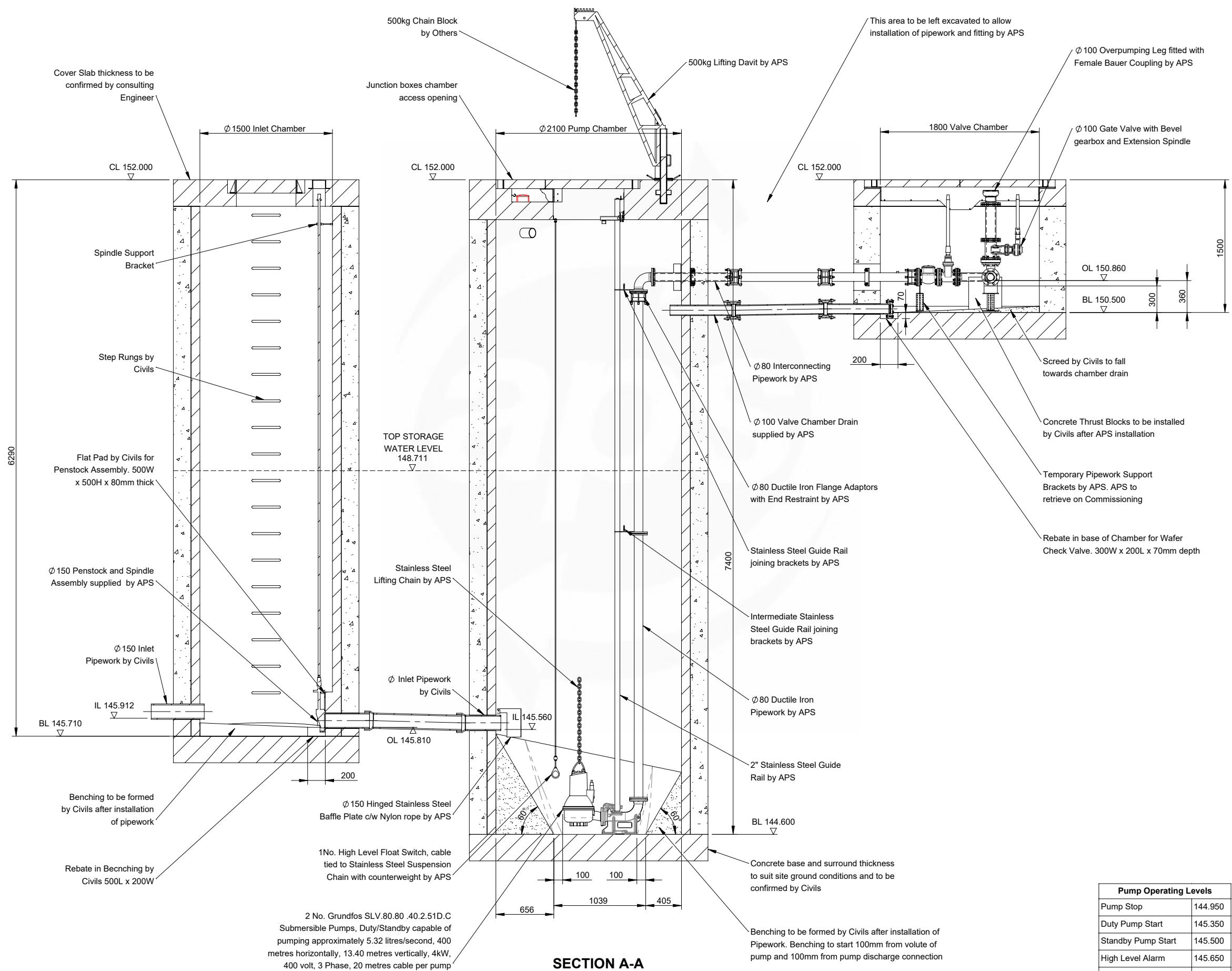
Works Order Number: **WO9238**

Size:	Scale:	Drawn:	Checked:	Approved:
A3	1:45	GR	CW	CW

Drawing Number: **EQ5533-152469-100** Date: **08/06/2023**

Internal Reference: **APS 5533** Issue: **A**

ELEVATION SECTION VIEW



SECTION A-A

Pump Operating Levels	
Pump Stop	144.950
Duty Pump Start	145.350
Standby Pump Start	145.500
High Level Alarm	145.650
Duty Point	145.150

Approved by:

Date:

Signed:

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Notes

- All works to be carried out in accordance with Design and Construction Guidance as amended by the UU Addendum.
- All Civils works to be completed by Civil contractor.
- Box outs to be filled and made good by civil contractor once pipework has been installed.
- All dimensions in mm unless otherwise stated.
- Benching to be completed after APS installation.
- Cable ducts to be installed by civil contractor complete with draw-cords. Specific sizes shown within drawing detail.
- Cable ducts to be sealed with 'Rise' sealant by APS at kiosk and field ends only.
- All structural calculations to be completed by structural engineer. APS have no involvement with the design of wet well cover and base slab.
- Flow calculations based on 110mm OD MDPE SDR11 Rising Main.
- Pumps are Non-EX rated as a result of the Atex risk assessment.
- All Electrical Equipment is Non-EX rated as a result of the Atex risk assessment.
- All fittings are to be stainless steel.
- The pumps are to be labelled 'Pump1' & 'Pump2'.
- All Equipment within wet well and valve chamber to be earth bonded by APS in accordance with Design and Construction Guidance as amended by the UU Addendum.
- All fixing bolts into concrete to be stainless steel.

A	Drawing for Approval	08/06/2023	GR
Issue:	Description:	Date:	Auth:



Tel: 01743465463
Fax: 01743452050
Email: sales@allpumpsolutions.com



FLUID EXPERTISE

Title: **Supply and Installation of all Pipework, Valves and Pump related fittings from the Inlet chamber into the Pumping Station, right through to the discharge from the valve chamber - Elevation Section View**

Contract: **Land edged red Hollingworth Road, Littleborough, Rochdale**

Contractor: **Countryside Partnership (Yorkshire)**

Consulting Engineer: **Eastwood & Partners Ltd**

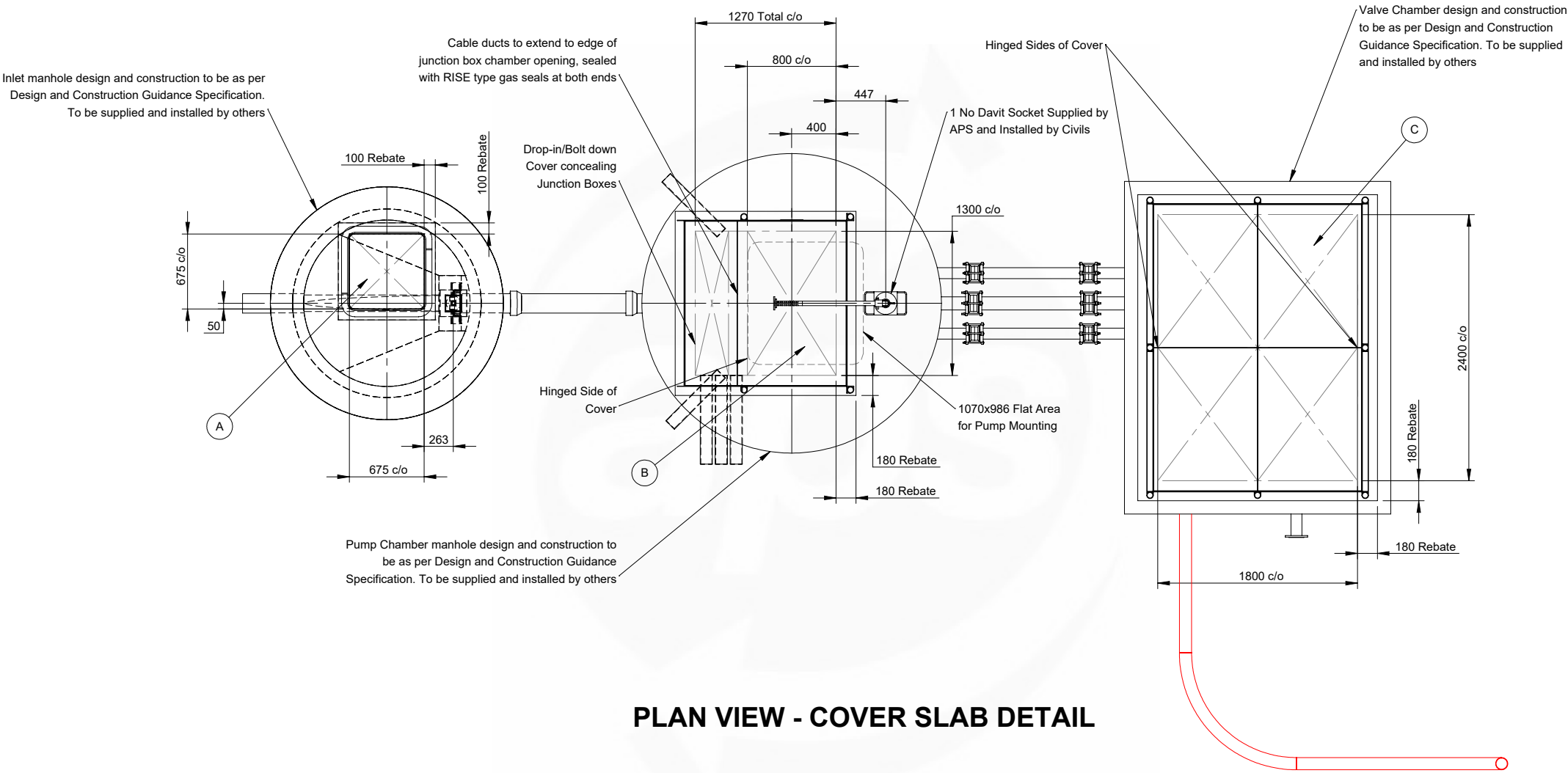
Works Order Number: **WO9238**

Size:	Scale:	Drawn:	Checked:	Approved:
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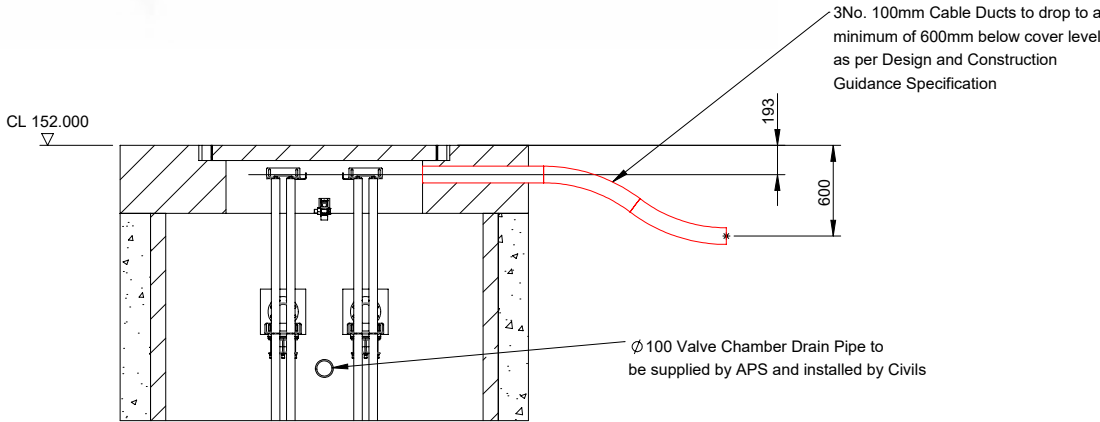
Drawing Number: **EQ5533-152469-200** Date: **08/06/2023**

Internal Reference: **APS 5533** Issue: **A**

COVER	CHAMBER	DESCRIPTION
A	INLET CHAMBER	1 No. Inlet Chamber 675mm x 675mm D400 Ductile Iron Solid Access Cover and Frame (Double Triangle)
B	PUMP CHAMBER	1 no. 1300mm x 1270mm clear opening Stamp-Lock Prolift, mild steel hinged access cover and frame. FACTA B loading class galvanized to BS EN 1461
C	VALVE CHAMBER	1 No. Valve Chamber 2400mm x 1800mm clear opening. Stamp-Lock Prolift Mild steel hinged access cover and frame. Plain seated - no seal, Torsion spring assisted lift, "Teagle" (pump through) safety grid or single safety grid, 'Stamp-lock' unique locking mechanism, External demountable safety barriers, Recessed padlock box, Self locating cover safety stays. FACTA B loading class, Galvanized to BS EN 1461.



PLAN VIEW - COVER SLAB DETAIL



PUMP CABLE DUCT DETAIL

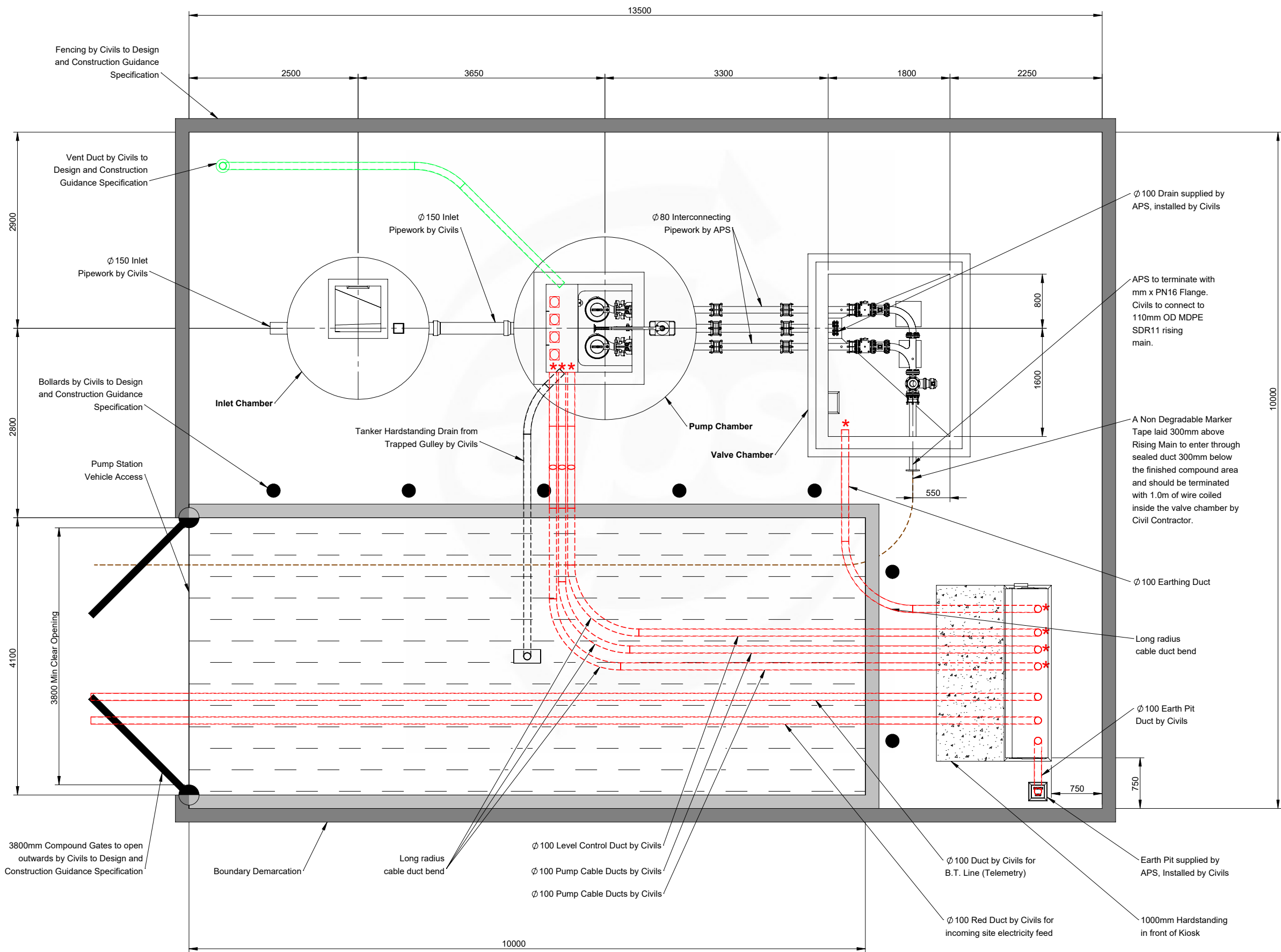
Approved by:

Date:	Signed:		
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Notes			
1. All works to be carried out in accordance with Design and Construction Guidance as amended by the UU Addendum.			
2. All Civils works to be completed by Civil contractor.			
3. Box outs to be filled and made good by civil contractor once pipework has been installed.			
4. All dimensions in mm unless otherwise stated.			
5. Benching to be completed after APS installation.			
6. Cable ducts to be installed by civil contractor complete with draw-cords. Specific sizes shown within drawing detail.			
7. Cable ducts to be sealed with 'Rise' sealant by APS at kiosk and field ends only.			
8. All structural calculations to be completed by structural engineer. APS have no involvement with the design of wet well cover and base slab.			
9. Flow calculations based on 110mm OD MDPE SDR11 Rising Main.			
10. Pumps are Non-EX rated as a result of the Atex risk assessment.			
11. All Electrical Equipment is Non-EX rated as a result of the Atex risk assessment.			
12. All fittings are to be stainless steel.			
13. The pumps are to be labelled 'Pump1' & 'Pump2'.			
14. All Equipment within wet well and valve chamber to be earth bonded by APS in accordance with Design and Construction Guidance as amended by the UU Addendum.			
15. All fixing bolts into concrete to be stainless steel.			
A	Drawing for Approval	08/06/2023	GR
Issue:	Description:	Date:	Auth:
 Tel: 01743465463 Fax:01743452050 Email: sales@allpumpsolutions.com all pump solutions FLUID EXPERTISE			
Title: Supply and Installation of all Pipework, Valves and Pump related fittings from the Inlet chamber into the Pumping Station, right through to the discharge from the valve chamber - Cover Detail			
Contract: Land edged red Hollingworth Road, Littleborough, Rochdale			
Contractor: Countryside Partnership (Yorkshire)			
Consulting Engineer: Eastwood & Partners Ltd			
Works Order Number: WO9238			
Size: A3	Scale: 1:50	Drawn: GR	Checked: CW
Drawing Number: EQ5533-152469-300		Date: 08/06/2023	
Internal Reference: APS 5533			Issue: A

SITE LAYOUT

NOTE: Cable Ducts to be gas sealed with 'Rise' type Sealant by APS in Junction Box compartment and in Kiosk.

Gas seals to be fitted at all locations marked with *



Approved by:

Date:

Signed:

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Notes

1. All works to be carried out in accordance with Design and Construction Guidance as amended by the UU Addendum.

2. All Civils works to be completed by Civil contractor.

3. Box outs to be filled and made good by civil contractor once pipework has been installed.

4. All dimensions in mm unless otherwise stated.

5. Benching to be completed after APS installation.

6. Cable ducts to be installed by civil contractor complete with draw-cords. Specific sizes shown within drawing detail.

7. Cable ducts to be sealed with 'Rise' sealant by APS at kiosk and field ends only.

8. All structural calculations to be completed by structural engineer. APS have no involvement with the design of wet well cover and base slab.

9. Flow calculations based on 110mm OD MDPE SDR11 Rising Main.

10. Pumps are Non-EX rated as a result of the Atex risk assessment.

11. All Electrical Equipment is Non-EX rated as a result of the Atex risk assessment.

12. All fittings are to be stainless steel.

13. The pumps are to be labelled 'Pump1' & 'Pump2'.

14. All Equipment within wet well and valve chamber to be earth bonded by APS in accordance with Design and Construction Guidance as amended by the UU Addendum.

15. All fixing bolts into concrete to be stainless steel.

A	Drawing for Approval	08/06/2023	GR
Issue:	Description:	Date:	Auth:

aps

all pump solutions

FLUID EXPERTISE

Tel: 01743465463

Fax: 01743452050

Email: sales@allpumpsolutions.com

Title: Supply and Installation of all Pipework, Valves and Pump related fittings from the Inlet chamber into the Pumping Station, right through to the discharge from the valve chamber - Site Layout

Contract: Land edged red Hollingworth Road, Littleborough, Rochdale

Contractor: Countryside Partnership (Yorkshire)

Consulting Engineer: Eastwood & Partners Ltd

Works Order Number: WO9238

Size: A3

Scale: 1:60

Drawn: GR

Checked: CW

Approved: CW

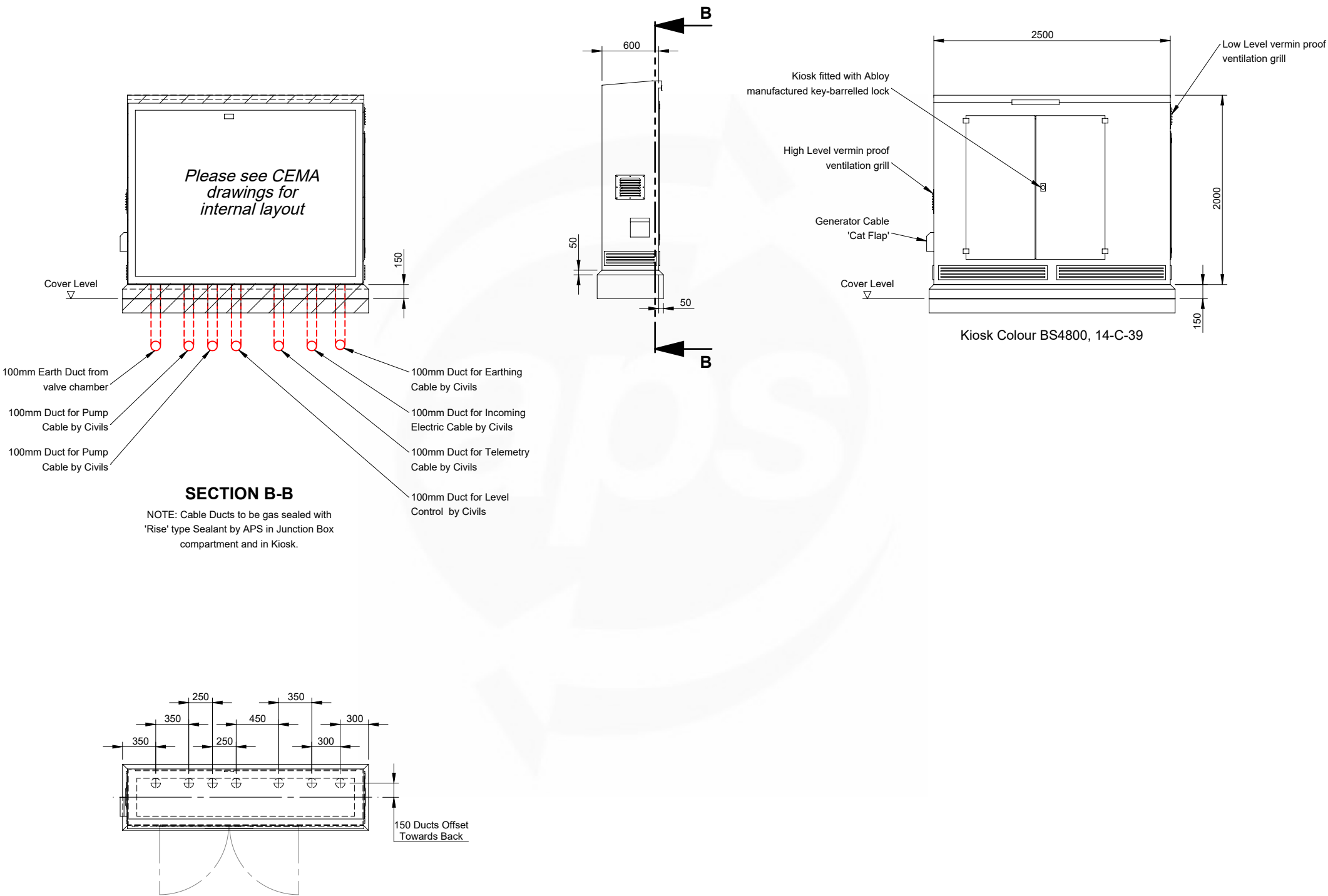
Drawing Number: EQ5533-152469-400

Date: 08/06/2023

Internal Reference: APS 5533

Issue: A

MCC KIOSK



Approved by:

Date:

Signed:

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Notes

1. All works to be carried out in accordance with Design and Construction Guidance as amended by the UU Addendum.

2. All Civils works to be completed by Civil contractor.

3. Box outs to be filled and made good by civil contractor once pipework has been installed.

4. All dimensions in mm unless otherwise stated.

5. Benching to be completed after APS installation.

6. Cable ducts to be installed by civil contractor complete with draw-cords. Specific sizes shown within drawing detail.

7. Cable ducts to be sealed with 'Rise' sealant by APS at kiosk and field ends only.

8. All structural calculations to be completed by structural engineer. APS have no involvement with the design of wet well cover and base slab.

9. Flow calculations based on 110mm OD MDPE SDR11 Rising Main.

10. Pumps are Non-EX rated as a result of the Atex risk assessment.

11. All Electrical Equipment is Non-EX rated as a result of the Atex risk assessment.

12. All fittings are to be stainless steel.

13. The pumps are to be labelled 'Pump1' & 'Pump2'.

14. All Equipment within wet well and valve chamber to be earth bonded by APS in accordance with Design and Construction Guidance as amended by the UU Addendum.

15. All fixing bolts into concrete to be stainless steel.

A

Drawing for Approval

08/06/2023

GR

Issue:

Description:

Date:

Auth:

aps

all pump solutions

FLUID EXPERTISE

Tel: 01743465463

Fax:01743452050

Email: sales@allpumpsolutions.com

Title:

Supply and Installation of all Pipework, Valves and Pump related fittings from the Inlet chamber into the Pumping Station, right through to the discharge from the valve chamber

- Kiosk Detail

Contract:

Land edged red Hollingworth Road, Littleborough, Rochdale

Contractor:

Countryside Partnership (Yorkshire)

Consulting Engineer:

Eastwood & Partners Ltd

Works Order Number:

WO9238

Size:

A3

Scale:

1:50

Drawn:

GR

Checked:

CW

Approved:

CW

Drawing Number:

EQ5533-152469-500

Date:

08/06/2023

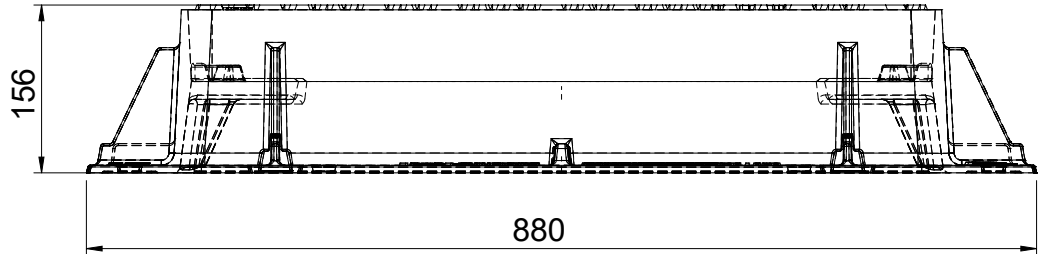
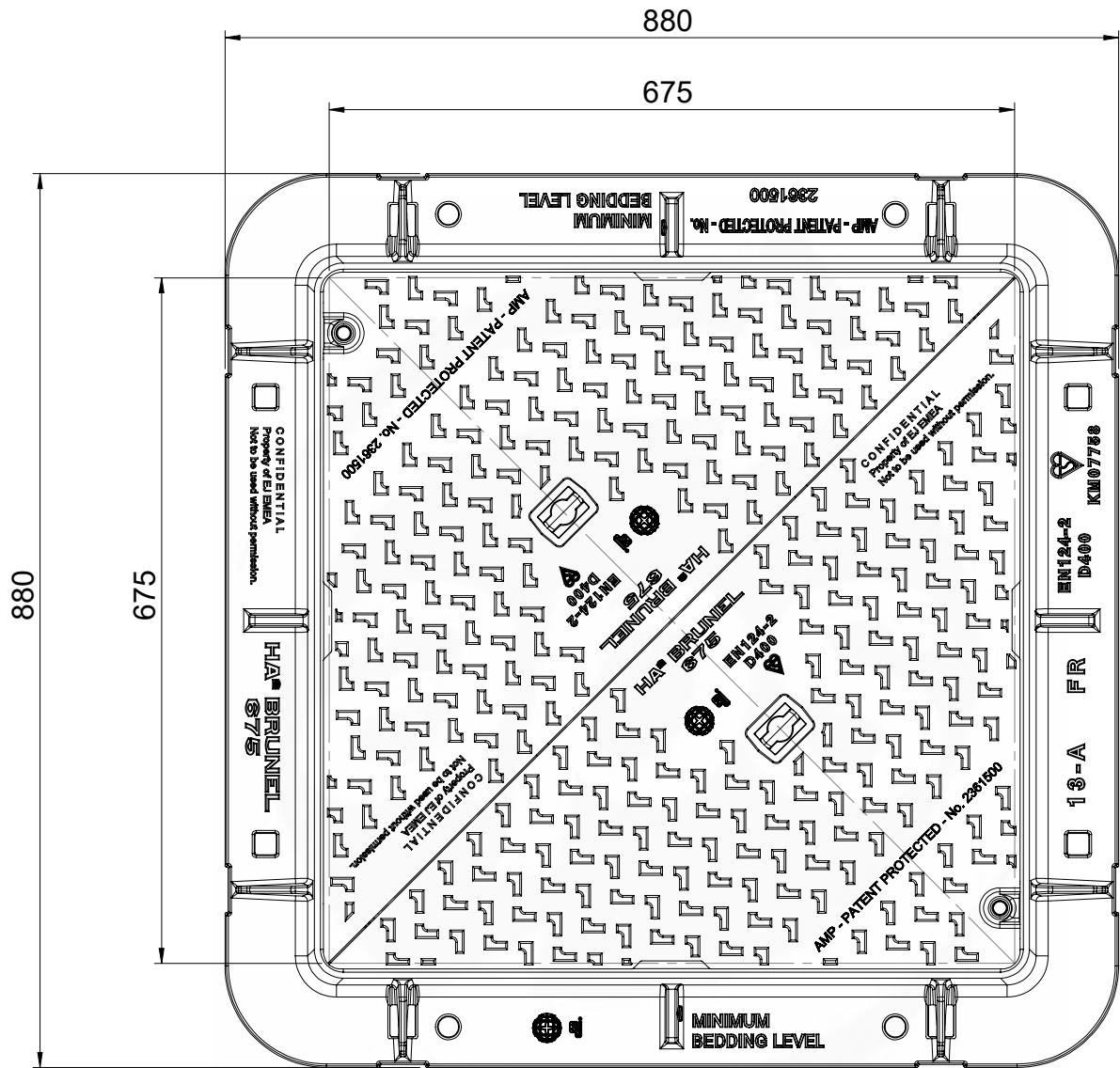
Internal Reference:

APS 5533

Issue:

A

INLET CHAMBER ACCESS COVER



Approved by:

Date:

Signed:

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Notes

1. All works to be carried out in accordance with Design and Construction Guidance as amended by the UU Addendum.

2. All Civils works to be completed by Civil contractor.

3. Box outs to be filled and made good by civil contractor once pipework has been installed.

4. All dimensions in mm unless otherwise stated.

5. Benching to be completed after APS installation.

6. Cable ducts to be installed by civil contractor complete with draw-cords. Specific sizes shown within drawing detail.

7. Cable ducts to be sealed with 'Rise' sealant by APS at kiosk and field ends only.

8. All structural calculations to be completed by structural engineer. APS have no involvement with the design of wet well cover and base slab.

9. Flow calculations based on 110mm OD MDPE SDR11 Rising Main.

10. Pumps are Non-EX rated as a result of the Atex risk assessment.

11. All Electrical Equipment is Non-EX rated as a result of the Atex risk assessment.

12. All fittings are to be stainless steel.

13. The pumps are to be labelled 'Pump1' & 'Pump2'.

14. All Equipment within wet well and valve chamber to be earth bonded by APS in accordance with Design and Construction Guidance as amended by the UU Addendum.

15. All fixing bolts into concrete to be stainless steel.

A

Drawing for Approval

08/06/2023

GR

Issue:

Description:

Date:

Auth:

aps

Tel: 01743465463

Fax:01743452050

Email: sales@allpumpsolutions.com

all pump solutions

FLUID EXPERTISE

Title: Supply and Installation of all Pipework, Valves and Pump related fittings from the Inlet chamber into the Pumping Station, right through to the discharge from the valve chamber
- Inlet Chamber Access Cover

Contract: Land edged red Hollingworth Road, Littleborough, Rochdale

Contractor: Countryside Partnership (Yorkshire)

Consulting Engineer: Eastwood & Partners Ltd

Works Order Number: WO9238

Size:

A3

Scale:

1:7

Drawn:

GR

Checked:

CW

Approved:

CW

Drawing Number:

EQ5533-152469-600

Date:

08/06/2023

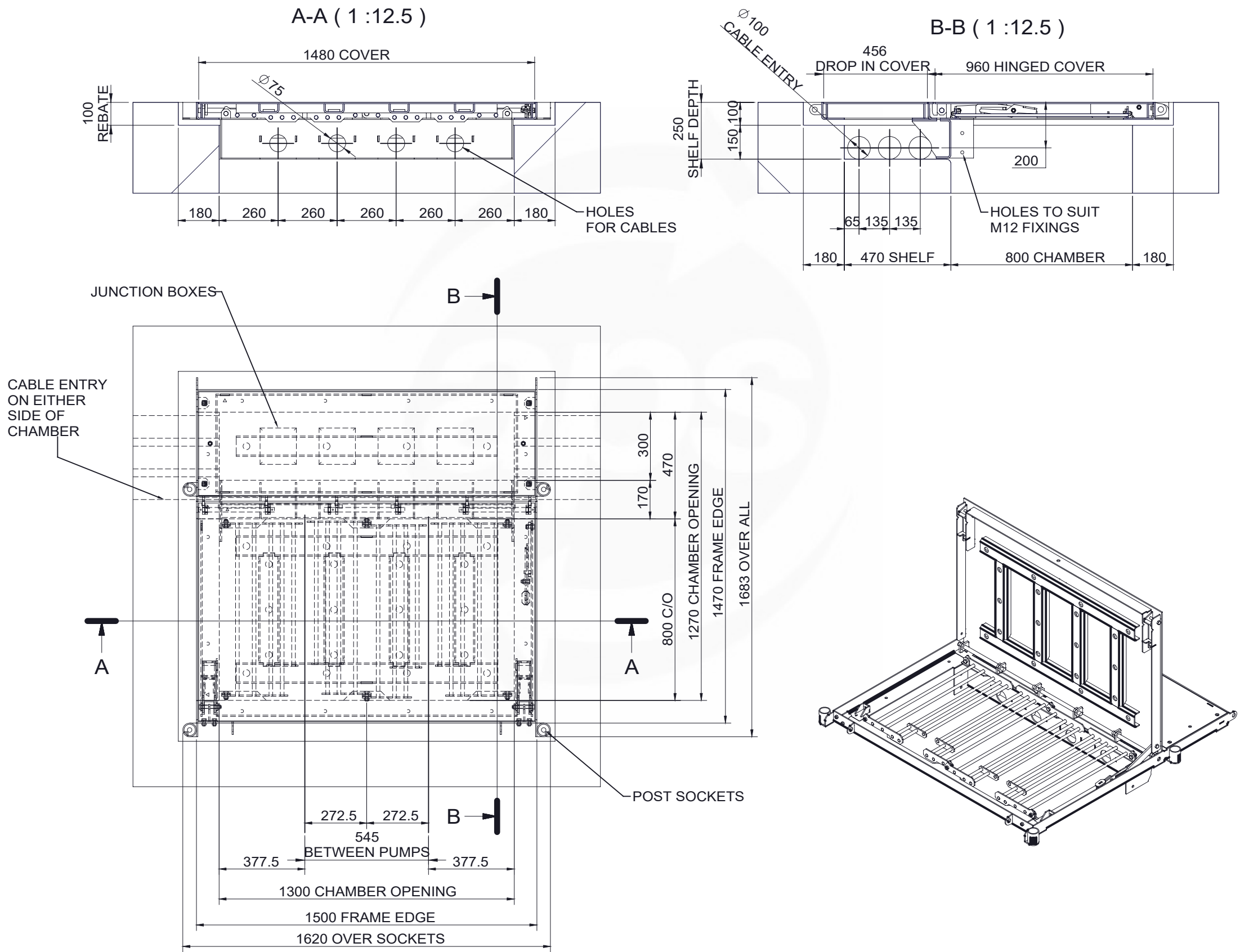
Internal Reference:

APS 5533

Issue:

A

PUMP CHAMBER ACCESS COVER



Approved by:

Date:	Signed:
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Notes	
1. All works to be carried out in accordance with Design and Construction Guidance as amended by the UU Addendum.	
2. All Civils works to be completed by Civil contractor.	
3. Box outs to be filled and made good by civil contractor once pipework has been installed.	
4. All dimensions in mm unless otherwise stated.	
5. Benching to be completed after APS installation.	
6. Cable ducts to be installed by civil contractor complete with draw-cords. Specific sizes shown within drawing detail.	
7. Cable ducts to be sealed with 'Rise' sealant by APS at kiosk and field ends only.	
8. All structural calculations to be completed by structural engineer. APS have no involvement with the design of wet well cover and base slab.	
9. Flow calculations based on 110mm OD MDPE SDR11 Rising Main.	
10. Pumps are Non-EX rated as a result of the Atex risk assessment.	
11. All Electrical Equipment is Non-EX rated as a result of the Atex risk assessment.	
12. All fittings are to be stainless steel.	
13. The pumps are to be labelled 'Pump1' & 'Pump2'.	
14. All Equipment within wet well and valve chamber to be earth bonded by APS in accordance with Design and Construction Guidance as amended by the UU Addendum.	
15. All fixing bolts into concrete to be stainless steel.	

A	Drawing for Approval	08/06/2023	GR
Issue:	Description:	Date:	Auth:



Tel: 01743465463
Fax:01743452050
Email: sales@allpumpsolutions.com

all pump solutions
FLUID EXPERTISE

Title: Supply and Installation of all Pipework, Valves and Pump related fittings from the Inlet chamber into the Pumping Station, right through to the discharge from the valve chamber
- Pump Chamber Cover

Contract: Land edged red Hollingworth Road,
Littleborough, Rochdale

Contractor: Countryside Partnership (Yorkshire)

Consulting Engineer: Eastwood & Partners Ltd

Works Order Number: WO9238

Size: A3	Scale: 1:15	Drawn: GR	Checked: CW	Approved: CW
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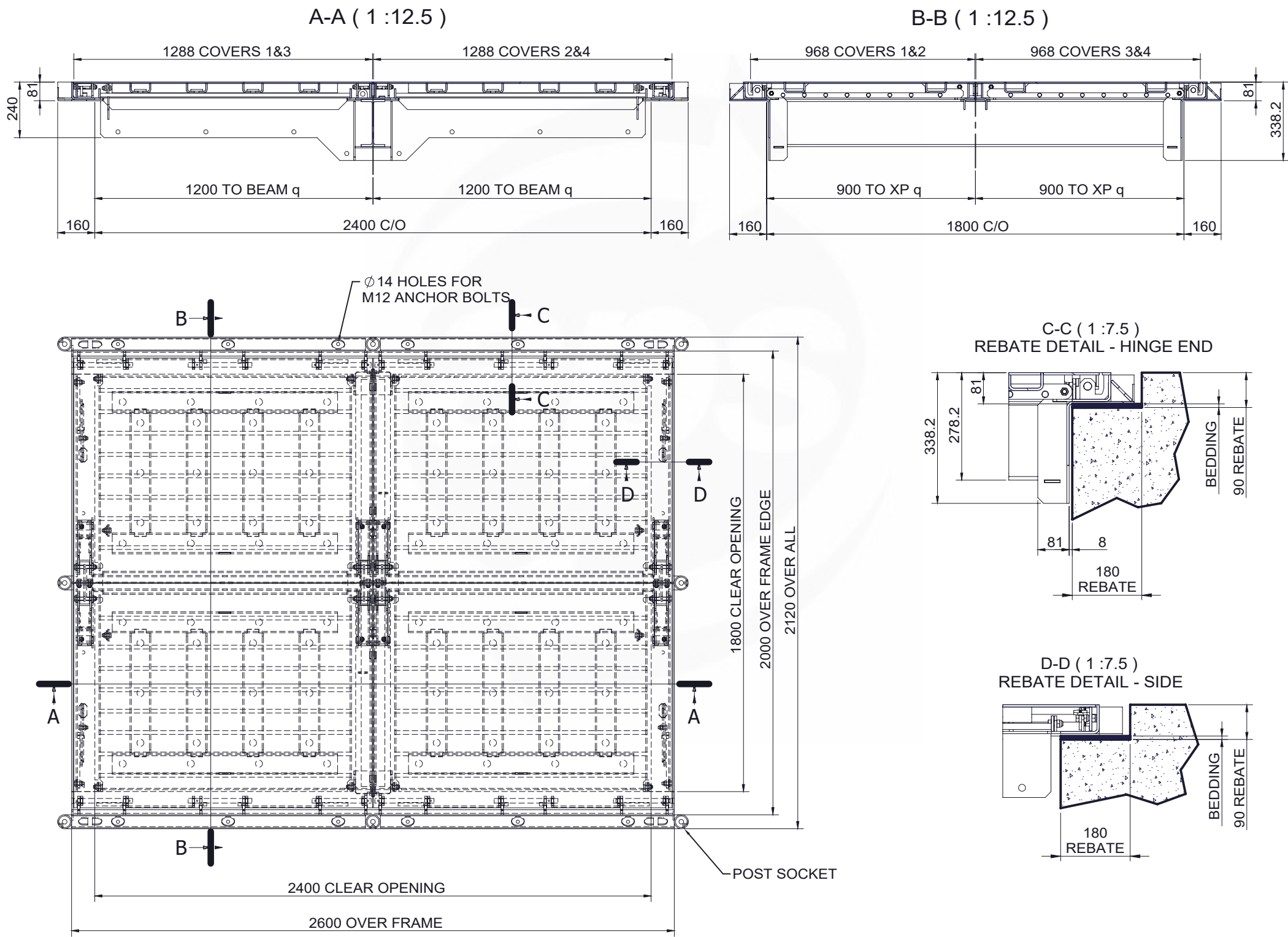
Drawing Number: EQ5533-152469-700

Date: 08/06/2023

Internal Reference: APS 5533

Issue: A

VALVE CHAMBER ACCESS COVER



Approved by:

Date:

Signed:

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Notes

1. All works to be carried out in accordance with Design and Construction Guidance as amended by the UU Addendum.

2. All Civils works to be completed by Civil contractor.

3. Box outs to be filled and made good by civil contractor once pipework has been installed.

4. All dimensions in mm unless otherwise stated.

5. Benching to be completed after APS installation.

6. Cable ducts to be installed by civil contractor complete with draw-cords. Specific sizes shown within drawing detail.

7. Cable ducts to be sealed with 'Rise' sealant by APS at kiosk and field ends only.

8. All structural calculations to be completed by structural engineer. APS have no involvement with the design of wet well cover and base slab.

9. Flow calculations based on 110mm OD MDPE SDR11 Rising Main.

10. Pumps are Non-EX rated as a result of the Atex risk assessment.

11. All Electrical Equipment is Non-EX rated as a result of the Atex risk assessment.

12. All fittings are to be stainless steel.

13. The pumps are to be labelled 'Pump1' & 'Pump2'.

14. All Equipment within wet well and valve chamber to be earth bonded by APS in accordance with Design and Construction Guidance as amended by the UU Addendum.

15. All fixing bolts into concrete to be stainless steel.

A

Drawing for Approval

08/06/2023

GR

Issue: Description: Date: Auth:

aps

all pump solutions

FLUID EXPERTISE

Tel: 01743465463

Fax:01743452050

Email: sales@allpumpsolutions.com

Title: Supply and Installation of all Pipework, Valves and Pump related fittings from the Inlet chamber into the Pumping Station, right through to the discharge from the valve chamber - Valve Chamber Cover

Contract: Land edged red Hollingworth Road, Littleborough, Rochdale

Contractor: Countryside Partnership (Yorkshire)

Consulting Engineer: Eastwood & Partners Ltd

Works Order Number: WO9238

Size: A3

Scale: 1:50

Drawn: GR

Checked: CW

Approved: CW

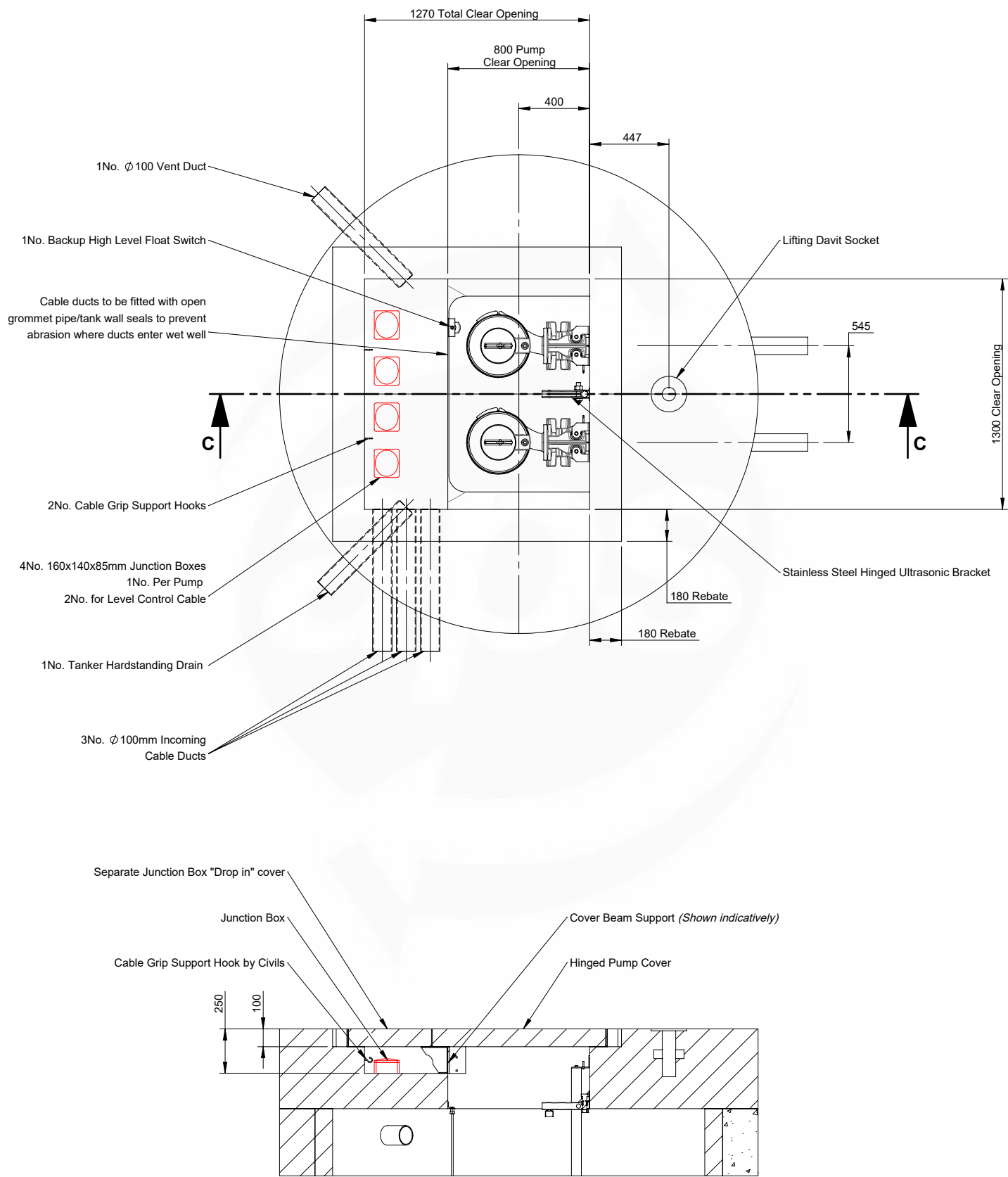
Drawing Number: EQ5533-152469-800

Date: 08/06/2023

Internal Reference: APS 5533

Issue: A

JUNCTION BOX INSTALLATION DETAIL



SECTION C-C

Approved by:

Date:

Signed:

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Notes

1. All works to be carried out in accordance with Design and Construction Guidance as amended by the UU Addendum.

2. All Civils works to be completed by Civil contractor.

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14. All Equipment within wet well and valve chamber to be earth bonded by APS in accordance with Design and Construction Guidance as amended by the UU Addendum.

15. All fixing bolts into concrete to be stainless steel.

A

Drawing for Approval

08/06/2023

GR

Issue:

Description:

Date:

Auth:

aps

all pump solutions

FLUID EXPERTISE

Tel: 01743465463

Fax:01743452050

Email: sales@allpumpsolutions.com

Title:

Supply and Installation of all Pipework, Valves and Pump related fittings from the Inlet chamber into the Pumping Station, right through to the discharge from the valve chamber - Junction Box Detail

Contract:

Land edged red Hollingworth Road, Littleborough, Rochdale

Contractor:

Countryside Partnership (Yorkshire)

Consulting Engineer:

Eastwood & Partners Ltd

Works Order Number:

WO9238

Size:

A3

Scale:

1:30

Drawn:

GR

Checked:

CW

Approved:

CW

Drawing Number:

EQ5533-152469-900

Date:

08/06/2023

Internal Reference:

APS 5533

Issue:

A

APPENDIX E.

WIRING DIAGRAMS



A	MS	AS	GM	FOR REVIEW & COMMENT	01.06.23
VER.	AUTH.	CHK'D	REV'D	REASON FOR ISSUE	DATE



Customer
ALL PUMP SOLUTIONS

Site Name:
HOLLINGWORTH ROAD,
LITTLEBOROUGH, ROCHDALE

Project
SSG DUAL PUMP (FORM 4)
CONTROL PANEL

DRAWING TITLE
GENERAL ARRANGEMENT OF SSG DUAL PUMP PUMPING STATION CONTROL PANEL

SCALE: N/A	SHEET SIZE A3
DRAWING No. .	REVISION A

COMPONENTS	DESCRIPTION
1	FUSES/ SWITCH
2	MULTI-FUNCTION POWER MONITOR (DIN96)
3	AMMETER (DIN72)
4	HOURS RUN METER
5	AUTO AVAILABLE INDICATOR (WHITE)
6	RUNNING INDICATOR (RED)
7	TRIPPED INDICATOR (AMBER)
8	MOTOR CURRENT HIGH/UNDERLOAD INDICATOR (AMBER)
9	MOTOR OVERTEMP. INDICATOR (AMBER)
10	NO FLOW INDICATOR (YELLOW)
11	START PUSHBUTTON (GREEN)
12	STOP PUSHBUTTON (RED)
13	RESET PUSHBUTTON (BLACK)
14	HAND/OFF/AUTO SELECTOR SWITCH
15	BACKUP CONTROL OPERATING INDICATOR (AMBER)
16	AUTO RESET IN PROGRESS INDICATOR (AMBER)
17	CONTROL SUPPLY HEALTHY INDICATOR (WHITE)
18	MAINS/OFF/GENERATOR SELECTOR SWITCH
19	DISTRIBUTION BOARD
20	230V 16A SOCKET OUTLET (BLUE)
21	QUANTUM 2 PULSAR ULTRASONIC CONTROLLER
22	BACKUP CONTROL RESET PUSHBUTTON (BLACK)
23	AUTO RESET FACILITY RESET PUSHBUTTON (BLACK)
24	MINICAS UNIT (IF REQUIRED)
25	MOTOR SEAL LEAK INDICATOR (AMBER)

CONSTRUCTION NOTES

- | |
|--|
| <ul style="list-style-type: none"> • PANEL TO BE A PRESS FORMED AND WELDED CONSTRUCTION TO FORM 4 TYPE 2. • PANEL INGRESS PROTECTION TO BE BSEN 60529, IP54. • PANEL REQUIRES BOTTOM CABLE ENTRY, FRONT ACCESS ONLY. • PANEL FINISH EXTERNAL RAL7035 (GREY) • PANEL GEARPLATES AND GLANDPLATES TO BE GALVANISED. • PANEL DOORS FITTED WITH 2 BIT LOCKS. • PANEL TO BE BUSWIRED – VIA DISTRIBUTION SPLITTER (MAINS INCOMER) • 1No. EARTH BAR (MAINS INCOMER) • CONTROL PANEL DOOR OPENINGS 120" • CONTROL PANEL THICKNESS; BODY 2mm/DOOR 2mm • CONTROL PANEL SYSTEM VOLTAGE 400V TP&N 4–WIRE 50Hz. |
|--|

LABELS	DESCRIPTION
A	WARNING DANGER 400V
B	WARNING DANGER 230V
C	CAUTION INTERNAL ISOLATOR
D	ATEX LABEL

COMPT	DESCRIPTION	TAG	RATED (A)	MOTOR (kW)	MOTOR FLC (A)	STARTING METHOD	COPPER (Cu)/CABLE (mmsq) (OPS W125-1)	GLAND/PLATE EARTH (mmsq) (OPS W121-2)	COMPT DEPTH (mm)	GEAR/PLATE	TIER HEAT LOSS (W)	TIER WEIGHT (kg)	
A	MAINS INCOMER		RATED: 63 FUSED: 40				16	20x5	FULL	TBC	TBC	TBC	
A	GENERATOR SOCKET		RATED: 63 FUSED: 40				16	20x5	FULL	TBC			
B	TELEMETRY							6 (M6)	FULL	TBC			
C	COMMON CONTROLS		RATED: 20 FUSED: 16				6	6 (M6)	FULL	TBC			
D	PUMP No.1	TBC	RATED: 20 FUSED: 16	4	8.2	ASD	6	6 (M6)	FULL	TBC			
E	PUMP No.2	TBC	RATED: 20 FUSED: 16	4	8.2	ASD	6	6 (M6)	FULL	TBC			
F	CABLEWAY												
											TOTAL	TBC	TBC

PLEASE NOTE: ALL OF THE ABOVE ARE INDICATIVE. CONFIRMATION SHALL BE POST FINAL DESIGN.

PLEASE NOTE, ALL OF THE ABOVE ARE INDICATIVE. CONFIRMATION SHALL BE POST FINAL DESIGN.



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ASSEMBLY REFERENCE SSG DUAL PUMP (F4)	COMPARTMENT REFERENCE N/A
--	------------------------------

CEMA DRAWING No.
QT121852/GA 2 OF 3

CEMA PROJECT ENGINEER

B.EAGER

[illegible]

A	MS	AS	GM	FOR REVIEW & COMMENT	01.06.23
VER.	AUTH.	CHK'D	REV'D	REASON FOR ISSUE	DATE



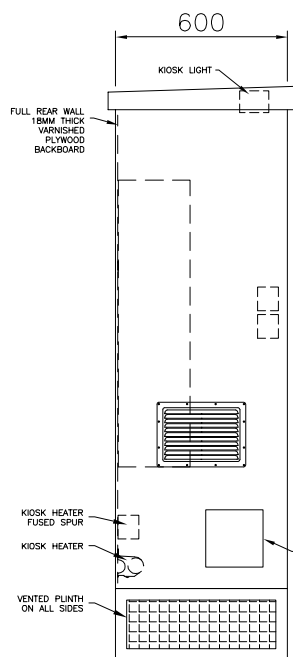
Customer
ALL PUMP SOLUTIONS

Site Name:
HOLLINGWORTH ROAD,
LITTLEBOROUGH, ROCHDALE

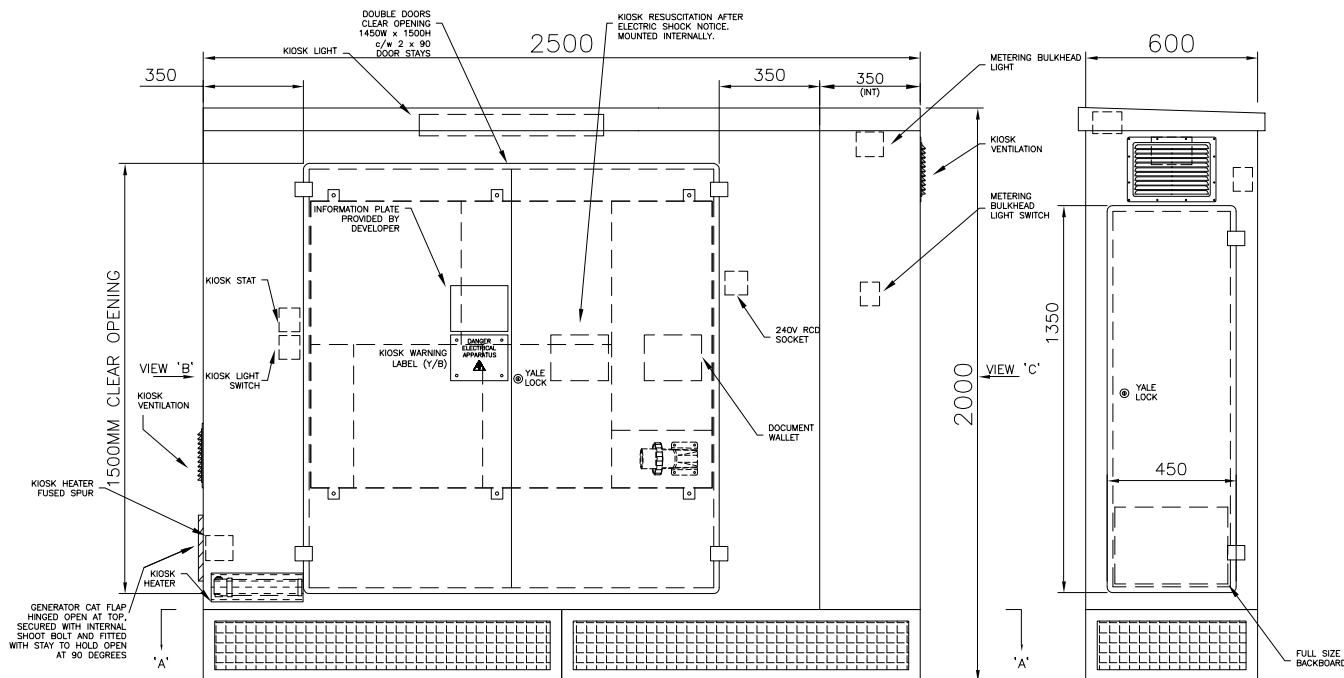
Project	SSG DUAL PUMP (FORM 4)
	CONTROL PANEL

DRAWING TITLE
GENERAL ARRANGEMENT OF
SSG DUAL PUMP
PUMPING STATION
CONTROL PANEL

SCALE: N/A	SHEET SIZE A3
DRAWING No. .	REVISION A

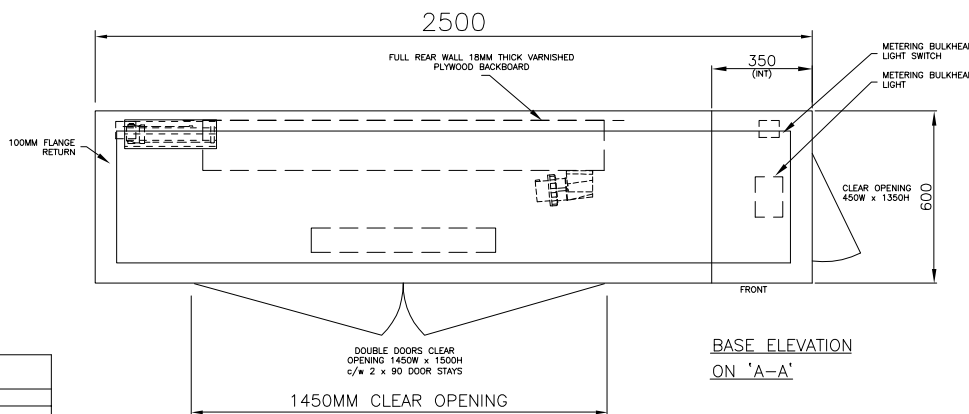


SIDE ELEVATION 'B'



FRONT ELEVATION

SIDE ELEVATION 'C'



BASE ELEVATION
ON 'A-A'

CONSTRUCTION NOTES

- KIOSK TO BE GRP CONSTRUCTION
- EXTERNAL COLOUR - 14-C-39 HOLLY GREEN.
- INTERNAL COLOUR - WHITE GRP.
- FULL 18mm PLYWOOD BACKBOARD.
- 200mmH x 200mmW LOCKABLE CAT FLAP.
- 2No. VENTS C/W VERMIN SCREEN & EXTERNAL COWL.
- 1No. DOUBLE DOOR 1450mmW x 1500mmH CLEAR OPENING.
- 1No. SINGLE DOOR 450mmW x 1350mmH CLEAR OPENING. (METERING SECTION)
- 2No. STAINLESS STEEL DOOR STAYS.
- 2No. YALE LOCKS

A	MS	AS	GM	FOR REVIEW & COMMENT	01.06.23
VER.	AUTH.	CHK'D	REV'D	REASON FOR ISSUE	DATE



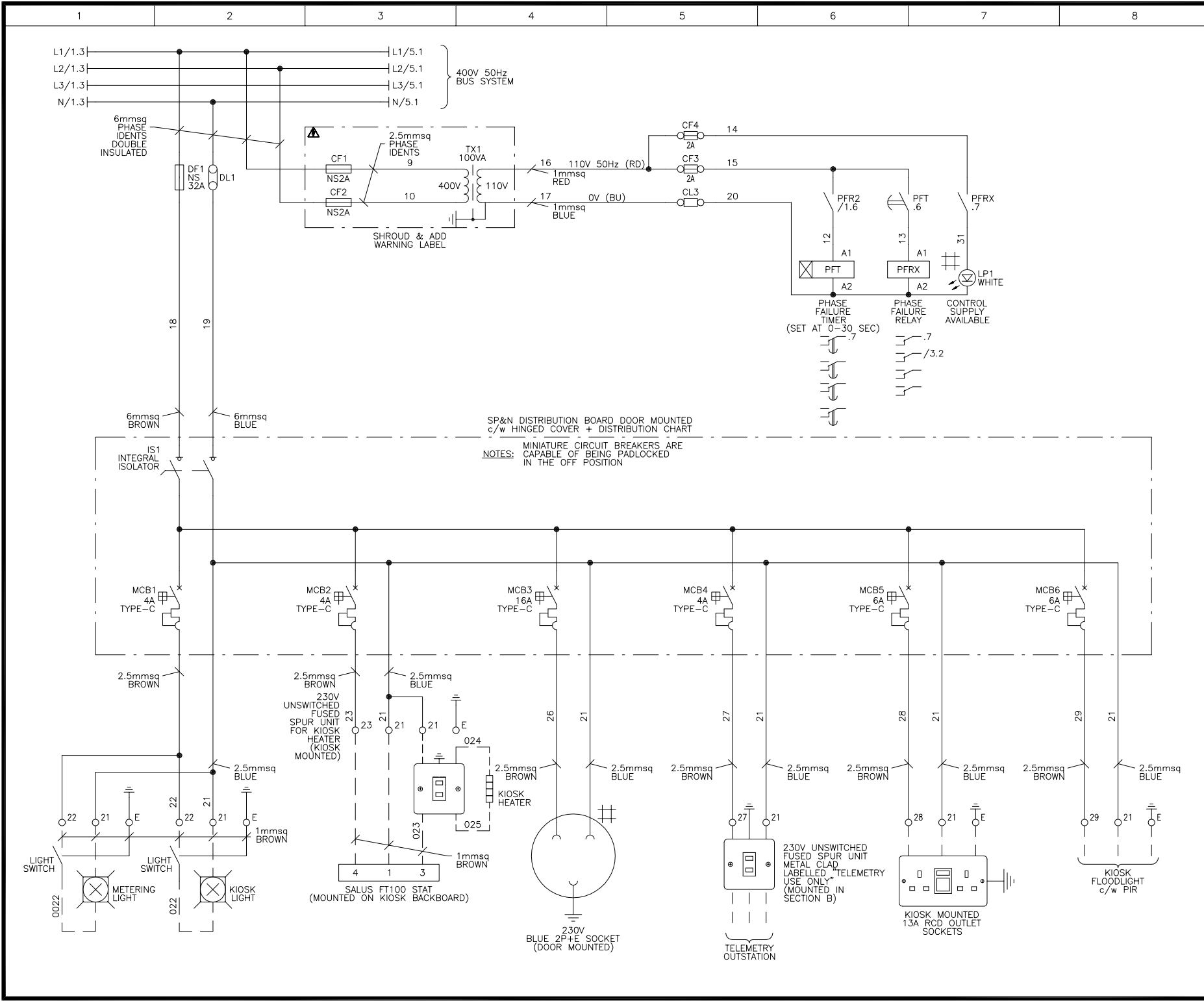
Customer
ALL PUMP SOLUTIONS

Site Name:
HOLLINGWORTH ROAD,
LITTLEBOROUGH, ROCHDALE

Project
SSG DUAL PUMP (FORM 4)
CONTROL PANEL

DRAWING TITLE
GENERAL ARRANGEMENT OF
SSG DUAL PUMP
PUMPING STATION
CONTROL PANEL

SCALE: N/A	SHEET SIZE A3
DRAWING No. -	REVISION A



CENTRAL ELECTRICAL
MANUFACTURING AND AUTOMATION

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ASSEMBLY REFERENCE	COMPARTMENT REFERENCE
SSG DUAL PUMP (F4)	A

CEMA DRAWING No. QT121852/SW 2 OF 23

CEMA PROJECT ENGINEER
B.EAGER

☒ DOOR INTERLOCKED ☒ DOOR MOUNTED

UNLESS SPECIFIED ALL CONTROL CABLES TO BE:

110V 50Hz	-	1mmsq RED
0V	-	1mmsq BLUE
24VDC +VE	-	1mmsq YELLOW
24VDC -VE	-	1mmsq BLUE
TELEMETRY	-	1mmsq PINK
4-20mA	-	2 CORE SCREEN

A	MS	AS	GM	FOR REVIEW & COMMENT	01.06.23
VER.	AUTH.	CHK'D	REV'D	REASON FOR ISSUE	DATE

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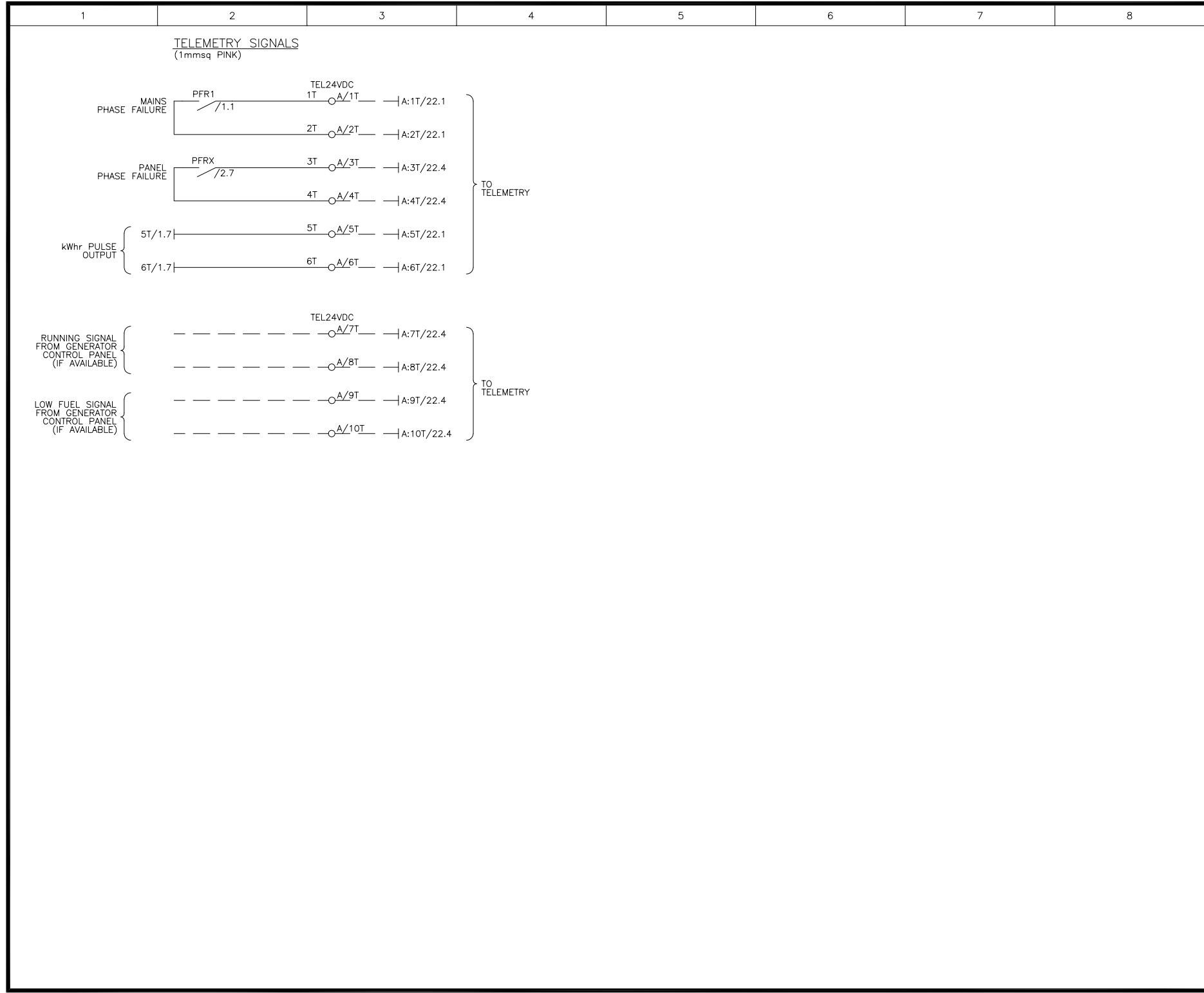
Customer
ALL PUMP SOLUTIONS

Site Name:
HOLLINGWORTH ROAD,
LITTLEBOROUGH,ROCHDALE

Project
SSG DUAL PUMP (FORM 4)
CONTROL PANEL

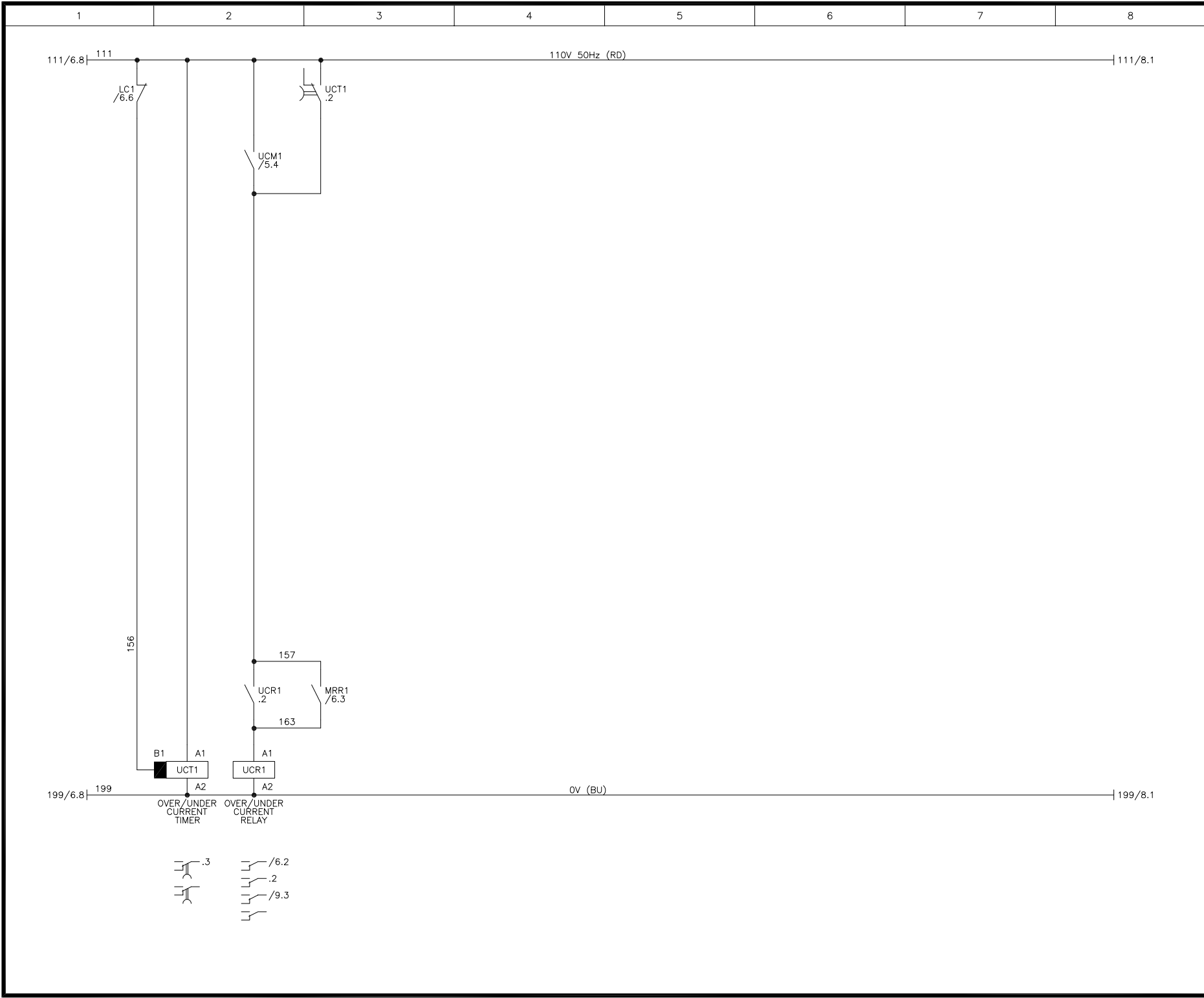
DRAWING TITLE
CIRCUIT DIAGRAM OF
MAINS INCOMERS

SCALE: N/A	SHEET SIZE A3
DRAWING No. -	REVISION A





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ASSEMBLY REFERENCE SSG DUAL PUMP (F4)				COMPARTMENT REFERENCE A			
CEMA DRAWING No. QT121852/SW 4 OF 23							
CEMA PROJECT ENGINEER B.EAGER							
☒ DOOR INTERLOCKED ☐ DOOR MOUNTED UNLESS SPECIFIED ALL CONTROL CABLES TO BE: 110V 50Hz - 1mmsq RED 24VDC 0V - 1mmsq BLUE 24VDC +VE - 1mmsq YELLOW 24VDC -VE - 1mmsq BLUE TELEMETRY - 1mmsq PINK 4-20mA - 2 CORE SCREEN							
A	MS	AS	GM	FOR REVIEW & COMMENT			01.06.23
VER.	AUTH.	CHK'D	REV'D	REASON FOR ISSUE			DATE
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Customer ALL PUMP SOLUTIONS							
Site Name: HOLLINGBOROUGH ROAD, LITTLEBROUGH,ROCHDALE							
Project SSG DUAL PUMP (FORM 4) DRAWING PANEL							
DRAWING TITLE CIRCUIT DIAGRAM OF MAINS INCOMERS							
SCALE: N/A						SHEET SIZE A3	
DRAWING No. -						REVISION A	





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SSG DUAL PUMP (F4)

COMPARTMENT REFERENCE
D

CEMA DRAWING No.
QT121852/SW

7 OF 23

CEMA PROJECT ENGINEER
B.EAGER

☒ DOOR INTERLOCKED ☐ DOOR MOUNTED

UNLESS SPECIFIED ALL CONTROL CABLES TO BE:
110V 50Hz - 1mmsq RED
0V - 1mmsq BLUE
24VDC +VE - 1mmsq YELLOW
24VDC -VE - 1mmsq BLUE
TELEMETRY - 1mmsq PINK
4-20mA - 2 CORE SCREEN

A	MS	AS	GM	FOR REVIEW & COMMENT	01.06.23
VER.	AUTH.	CHK'D	REV'D	REASON FOR ISSUE	DATE



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Customer
ALL PUMP SOLUTIONS

Site Name:
HOLLINGWORTH ROAD,
LITTLEBOROUGH,ROCHDALE

Project
SSG DUAL PUMP (FORM 4)
CONTROL PANEL

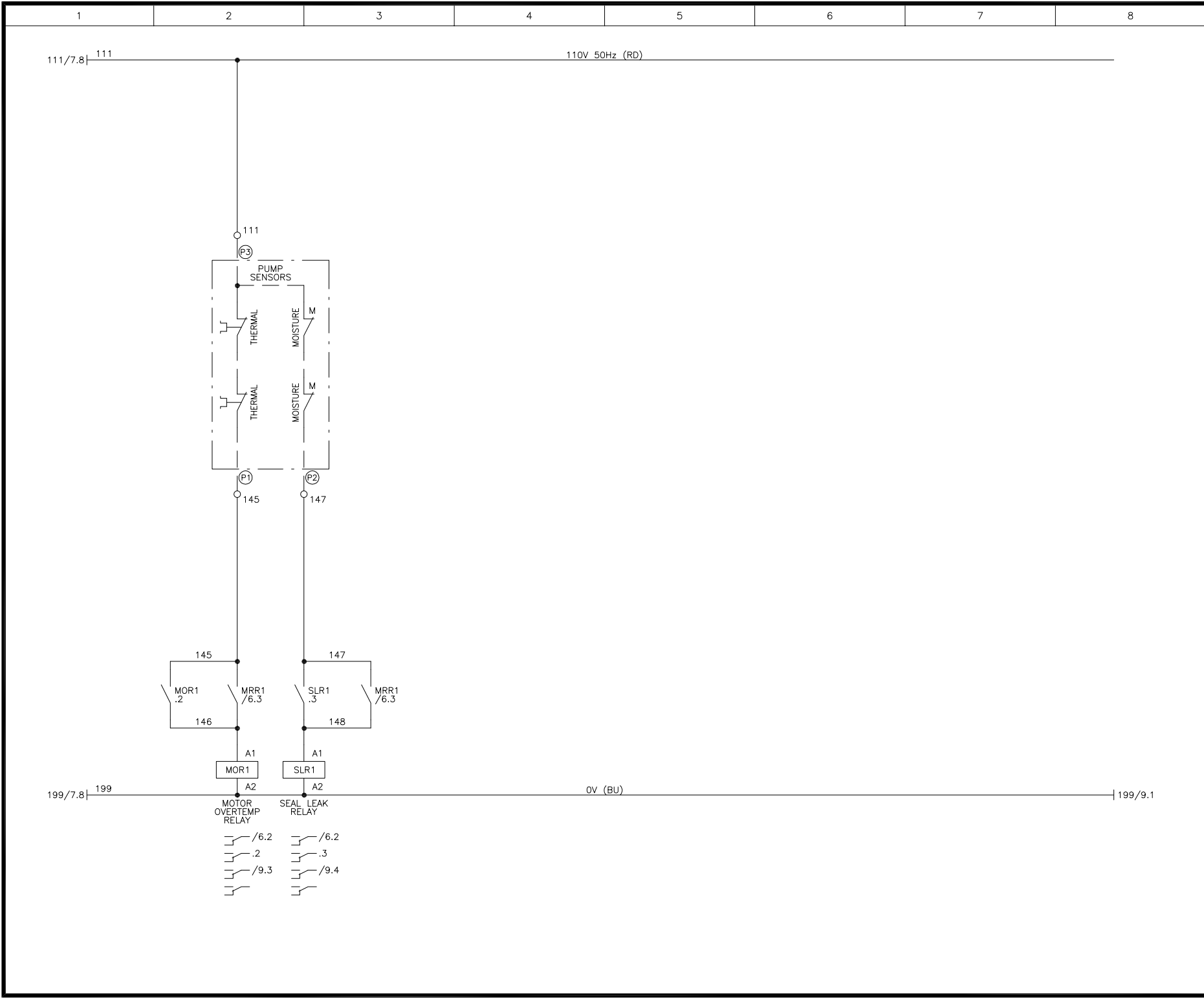
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CIRCUIT DIAGRAM OF
PUMP No.1
ASD STARTER

SCALE:
N/A

DRAWING No.
.

SHEET SIZE
A3

REVISION
A



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SSG DUAL PUMP (F4)	D

CEMA DRAWING No.
QT121852/SW

CEMA PROJECT ENGINEER
B.EAGER

☒ DOOR INTERLOCKED ☐ DOOR MOUNTED

UNLESS SPECIFIED ALL CONTROL CABLES TO BE:

110V 50Hz	-	1mmsq	RED
0V	-	1mmsq	BLUE
24VDC +VE	-	1mmsq	YELLOW
24VDC -VE	-	1mmsq	BLUE
TELEMETRY	-	1mmsq	PINK
4-20mA	-	2	CORE SCREEN

A	MS	AS	GM	FOR REVIEW & COMMENT	01.06.23
VER.	AUTH.	CHK'D	REV'D	REASON FOR ISSUE	DATE

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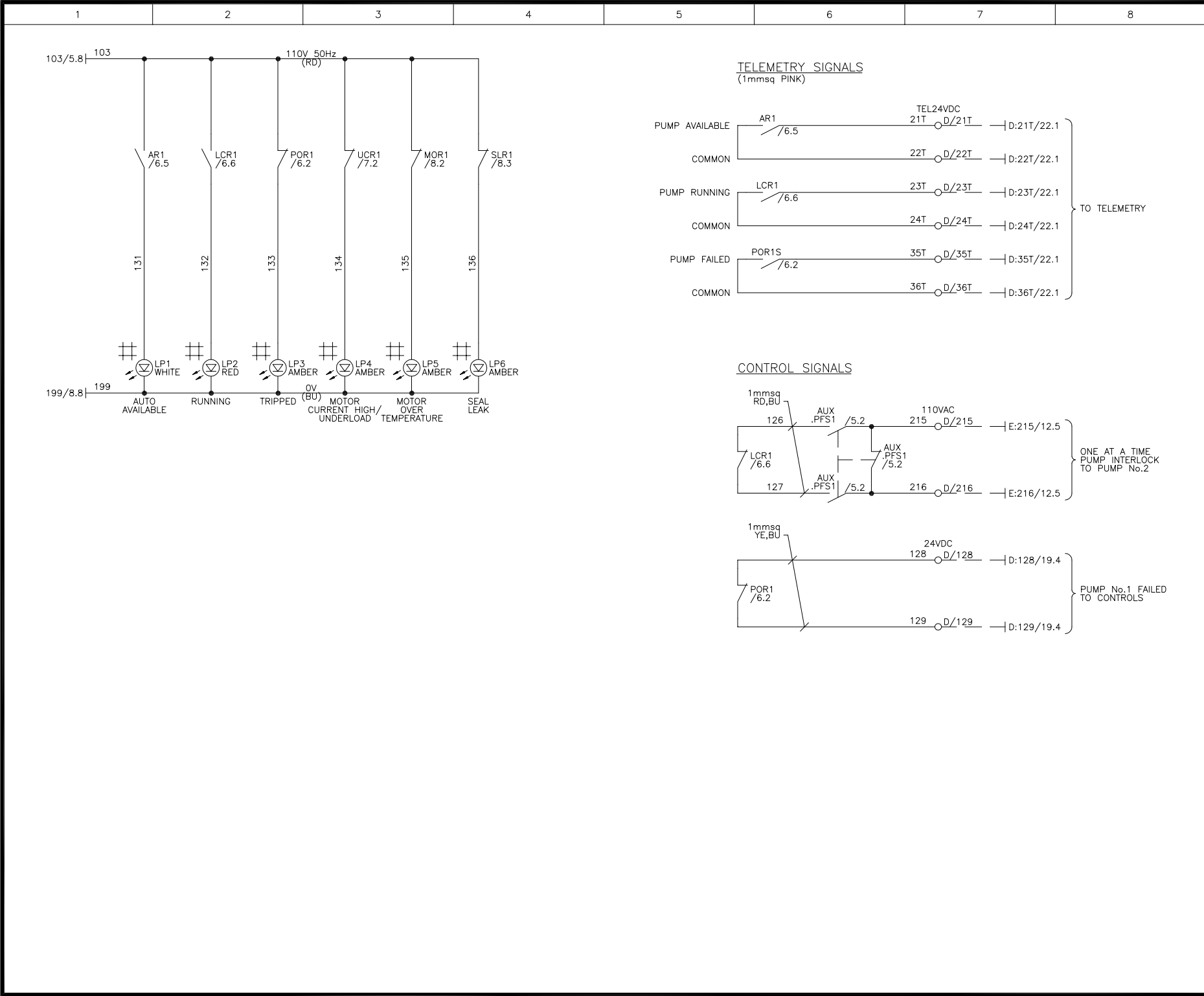
Customer
ALL PUMP SOLUTIONS

Site Name:
HOLLINGWORTH ROAD,
LITTLEBOROUGH,ROCHDALE

Project
SSG DUAL PUMP (FORM 4)
CONTROL PANEL

DRAWING TITLE
CIRCUIT DIAGRAM OF
PUMP No.1
ASD STARTER

SCALE: N/A	SHEET SIZE A3
DRAWING No. .	REVISION A





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ASSEMBLY REFERENCECOMPARTMENT REFERENCE
SSG DUAL PUMP (F4)D

CEMA DRAWING No.
QT121852/SW9 OF 23

CEMA PROJECT ENGINEER
B.EAGER

☒ DOOR INTERLOCKED ☐ DOOR MOUNTED

UNLESS SPECIFIED ALL CONTROL CABLES TO BE:
110V 50Hz - 1mmsq RED
0V - 1mmsq BLUE
24VDC +VE - 1mmsq YELLOW
24VDC -VE - 1mmsq BLUE
TELEMETRY - 1mmsq PINK
4-20mA - 2 CORE SCREEN

A	MS	AS	GM	FOR REVIEW & COMMENT	01.06.23
VER.	AUTH.	CHK'D	REV'D	REASON FOR ISSUE	DATE



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Customer
ALL PUMP SOLUTIONS

Site Name:
HOLLINGWORTH ROAD,
LITTLEBOROUGH,ROCHDALE

Project
SSG DUAL PUMP (FORM 4)
CONTROL PANEL

DRAWING TITLE
CIRCUIT DIAGRAM OF
PUMP No.1
ASD STARTER

SCALE:
N/A

DRAWING No.
.

SHEET SIZE
A3

REVISION
A



TERMINAL TO BE - VARIABLE

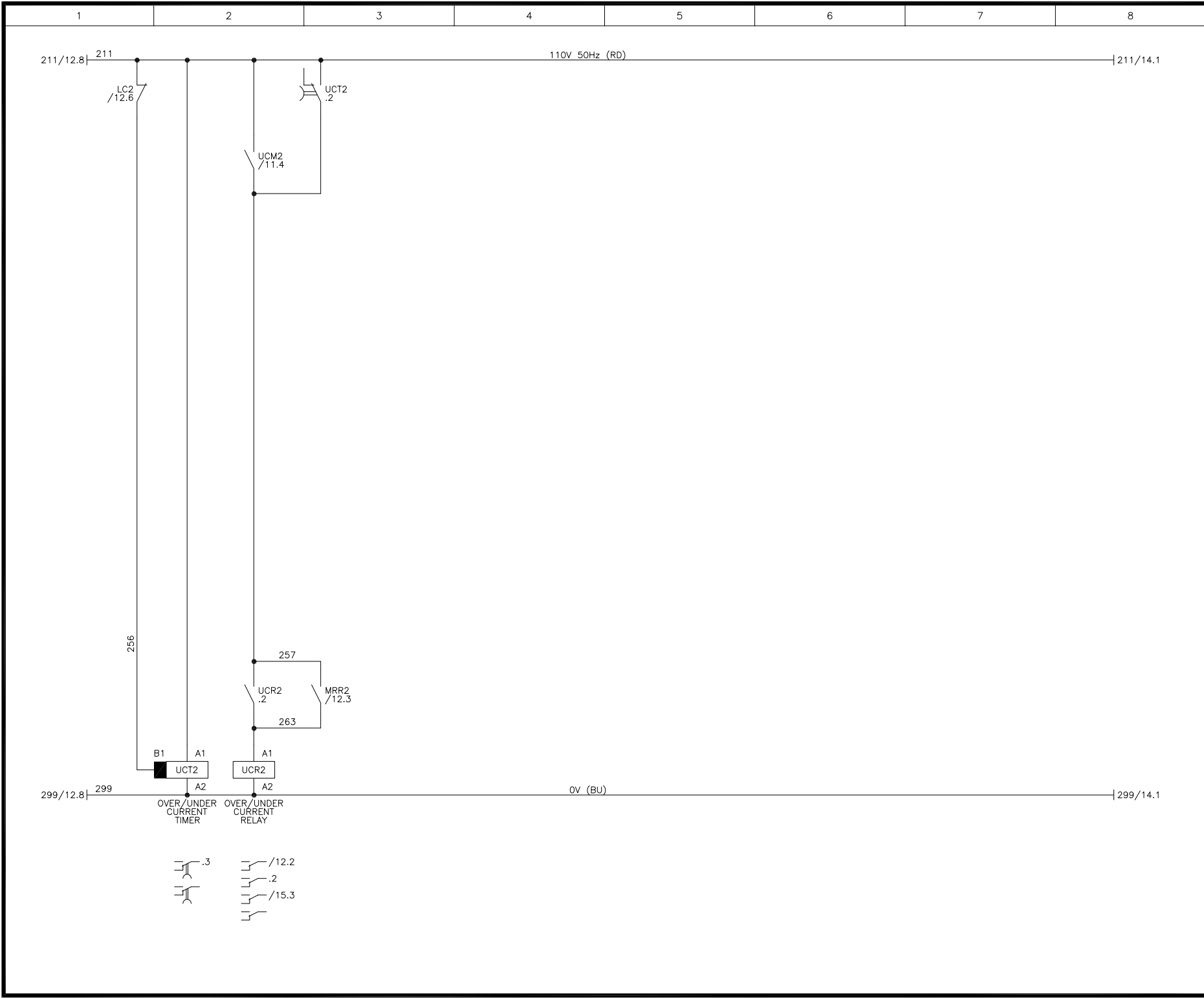
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TERMINAL TO BE - WDU2.5

TERMINAL TO BE - WTR2.5

TERMINAL TO BE - WTR2.5

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ASSEMBLY REFERENCE SSG DUAL PUMP (F4)				COMPARTMENT REFERENCE D		
CEMA DRAWING No. QT121852/SW 10 OF 23						
CEMA PROJECT ENGINEER B.EAGER						
☒ DOOR INTERLOCKED ☐ DOOR MOUNTED						
UNLESS SPECIFIED ALL CONTROL CABLES TO BE: 110V 50HZ - 1mmsq RED OV - 1mmsq BLUE 24VDC +VE - 1mmsq YELLOW 24VDC -VE - 1mmsq BLUE TELEMETRY - 1mmsq PINK 4-20ma - 2 CORE SCREEN						
A	MS	AS	GM	FOR REVIEW & COMMENT		01.06.23
VER.	AUTH.	CHK'D	REV'D	REASON FOR ISSUE		DATE
						
Customer ALL PUMP SOLUTIONS						
Site Name: HOLLINGWORTH ROAD, LITTLEBOROUGH,ROCHDALE						
Project SSG DUAL PUMP (FORM 4) CONTROL PANEL						
DRAWING TITLE CIRCUIT DIAGRAM OF PUMP No.1 ASD STARTER						
SCALE: N/A					SHEET SIZE A3	
DRAWING No. -					REVISION A	





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AND AUTOMATION

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ASSEMBLY REFERENCE
SSG DUAL PUMP (F4)

COMPARTMENT REFERENCE
E

CEMA DRAWING No.
QT121852/SW

13 OF 23

CEMA PROJECT ENGINEER
B.EAGER

☒ DOOR INTERLOCKED

☐ DOOR MOUNTED

UNLESS SPECIFIED ALL CONTROL CABLES TO BE:
110V 50Hz - 1mmsq RED
0V - 1mmsq BLUE
24VDC +VE - 1mmsq YELLOW
24VDC -VE - 1mmsq BLUE
TELEMETRY - 1mmsq PINK
4-20mA - 2 CORE SCREEN

A	MS	AS	GM	FOR REVIEW & COMMENT	01.06.23
VER.	AUTH.	CHK'D	REV'D	REASON FOR ISSUE	DATE



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Customer
ALL PUMP SOLUTIONS

Site Name:
HOLLINGWORTH ROAD,
LITTLEBOROUGH,ROCHDALE

Project
SSG DUAL PUMP (FORM 4)
CONTROL PANEL

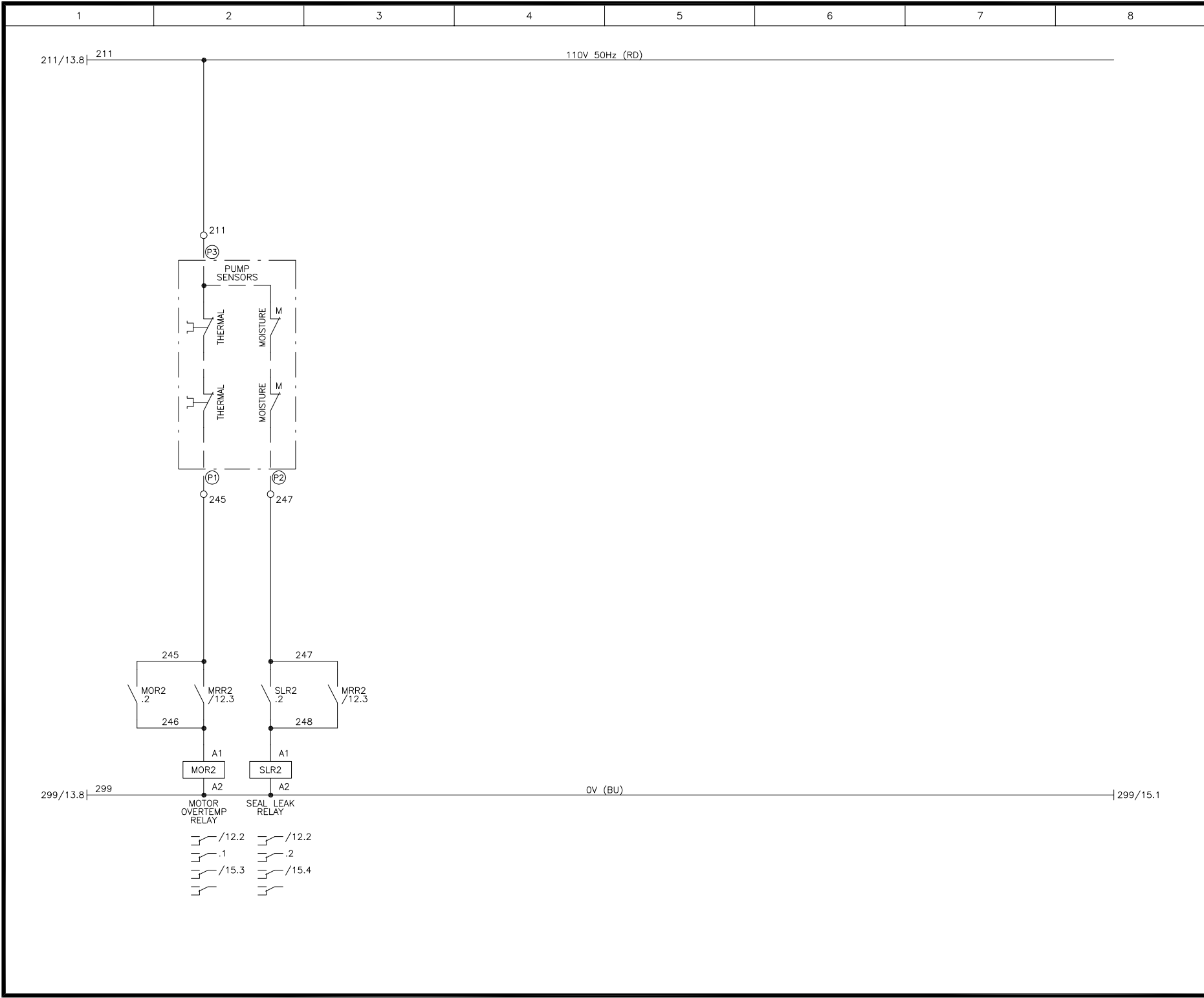
DRAWING TITLE
CIRCUIT DIAGRAM OF
PUMP No.2
ASD STARTER

SCALE:
N/A

DRAWING No.
.

SHEET SIZE
A3

REVISION
A





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ASSEMBLY REFERENCE
SSG DUAL PUMP (F4)

COMPARTMENT REFERENCE
E

CEMA DRAWING No.
QT121852/SW

14 OF 23

CEMA PROJECT ENGINEER
B.EAGER

☒ DOOR INTERLOCKED ☐ DOOR MOUNTED

UNLESS SPECIFIED ALL CONTROL CABLES TO BE:
110V 50Hz - 1mmsq RED
0V - 1mmsq BLUE
24VDC +VE - 1mmsq YELLOW
24VDC -VE - 1mmsq BLUE
TELEMETRY - 1mmsq PINK
4-20mA - 2 CORE SCREEN

A	MS	AS	GM	FOR REVIEW & COMMENT	01.06.23	
VER.	AUTH.	CHK'D	REV'D	REASON FOR ISSUE	DATE	



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Customer
ALL PUMP SOLUTIONS

Site Name:
HOLLINGWORTH ROAD,
LITTLEBOROUGH,ROCHDALE

Project
SSG DUAL PUMP (FORM 4)
CONTROL PANEL

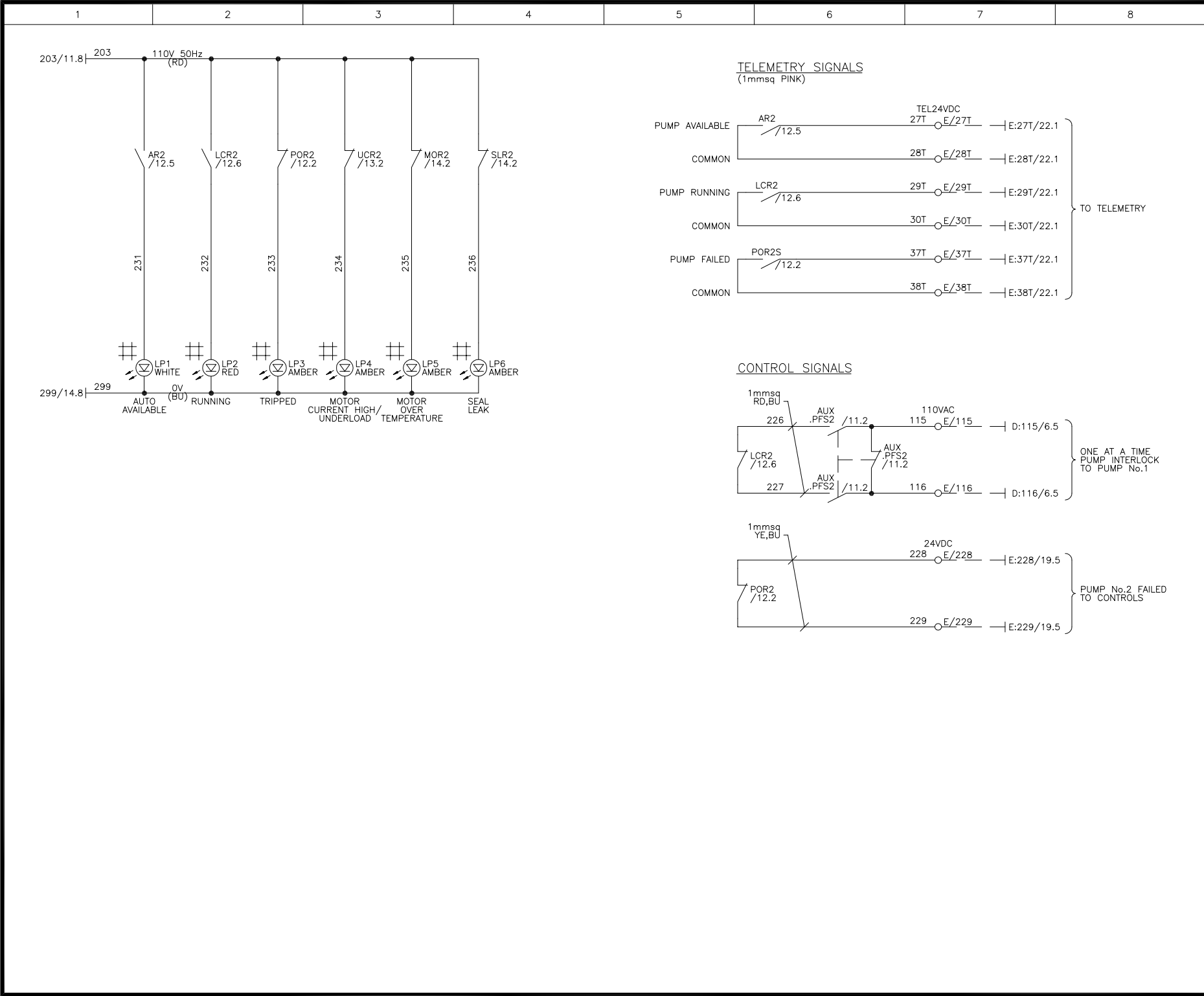
DRAWING TITLE
CIRCUIT DIAGRAM OF
PUMP No.2
ASD STARTER

SCALE:
N/A

DRAWING No.
-

SHEET SIZE
A3

REVISION
A





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QT121852/SW15 OF 23

CEMA PROJECT ENGINEER
B.EAGER

☒ DOOR INTERLOCKED ☐ DOOR MOUNTED

UNLESS SPECIFIED ALL CONTROL CABLES TO BE:
110V 50Hz - 1mmsq RED
0V - 1mmsq BLUE
24VDC +VE - 1mmsq YELLOW
24VDC -VE - 1mmsq BLUE
TELEMETRY - 1mmsq PINK
4-20mA - 2 CORE SCREEN

A	MS	AS	GM	FOR REVIEW & COMMENT	01.06.23
VER.	AUTH.	CHK'D	REV'D	REASON FOR ISSUE	DATE



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Site Name:
HOLLINGWORTH ROAD,
LITTLEBOROUGH,ROCHDALE

Project
SSG DUAL PUMP (FORM 4)
CONTROL PANEL

DRAWING TITLE
CIRCUIT DIAGRAM OF
PUMP No.2
ASD STARTER

SCALE:
N/A

DRAWING No.
.

SHEET SIZE
A3

REVISION
A

1	2	3	4	5	6	7	8
---	---	---	---	---	---	---	---

400VAC			
U1		1L1	MOTOR
V1		1L2	MOTOR
W1		1L3	MOTOR
E		GN/YL	MOTOR
V2		2L1	MOTOR
W2		2L2	MOTOR
U2		2L3	MOTOR

TERMINAL TO BE – VARIABLE

110VAC			
211		211	AUTO RESET SIGNAL FROM CONTROLS
206		206	AUTO RESET SIGNAL FROM CONTROLS
215		215	ONE AT A TIME PUMP INTERLOCK FROM PUMP No.1
216		216	ONE AT A TIME PUMP INTERLOCK FROM PUMP No.1
215		215	LINK TERMINALS IF DUTY/ASSIST OPERATION REQUIRED
216		216	LINK TERMINALS IF DUTY/ASSIST OPERATION REQUIRED
219		219	AUTOMATIC START/STOP
220		220	AUTOMATIC START/STOP
211		211	GRUNDFOS SEAL LEAK/MOTOR OVER TEMPERATURE SENSORS
245		245	GRUNDFOS SEAL LEAK/MOTOR OVER TEMPERATURE SENSORS
247		247	GRUNDFOS SEAL LEAK/MOTOR OVER TEMPERATURE SENSORS

TERMINAL TO BE – WDU2.5

P2 110VAC			
115		115	ONE AT A TIME PUMP INTERLOCK TO PUMP No.1
116		116	ONE AT A TIME PUMP INTERLOCK TO PUMP No.1

TERMINAL TO BE – WDU2.5

CC 24VDC			
228		229	CONTROL SIGNALS – COMMON
229		229	CONTROL SIGNALS – HEALTHY/TRIPPED

TERMINAL TO BE – WTR2.5

TEL 24VDC			
27T		27T	TELEMETRY MARSHALLING – AUTO CONTROL AVAILABLE/UNAVAILABLE
28T		28T	TELEMETRY MARSHALLING – AUTO CONTROL AVAILABLE/UNAVAILABLE
29T		29T	TELEMETRY MARSHALLING – RUNNING/STOPPED
30T		30T	TELEMETRY MARSHALLING – RUNNING/STOPPED
37T		37T	TELEMETRY MARSHALLING – HEALTHY/TRIPPED
38T		38T	TELEMETRY MARSHALLING – HEALTHY/TRIPPED

TERMINAL TO BE – WTR2.5



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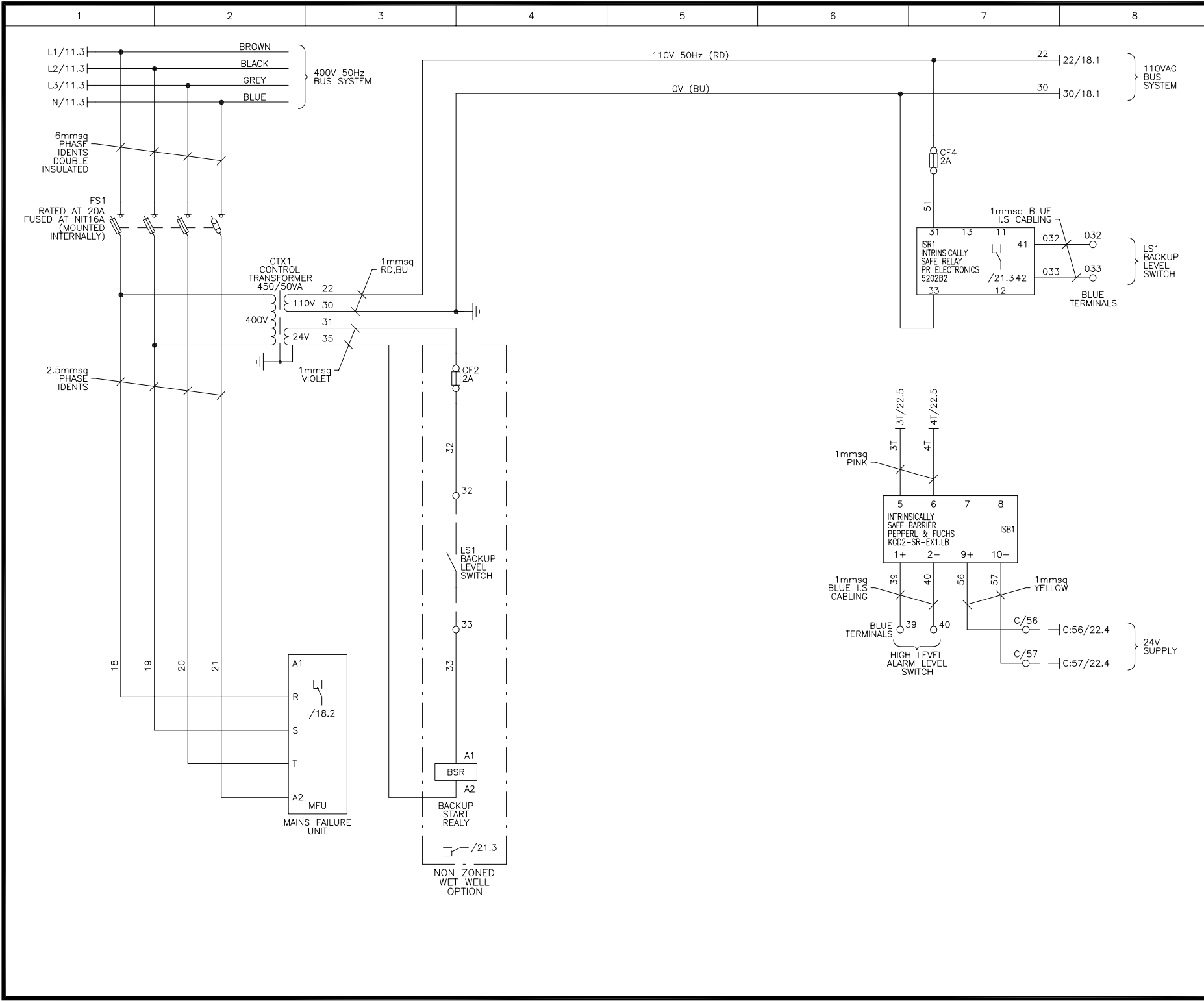
ASSEMBLY REFERENCE SSG DUAL PUMP (F4)	COMPARTMENT REFERENCE D
CEMA DRAWING No. QT121852/SW	16 OF 23
CEMA PROJECT ENGINEER B.EAGER	

☒ DOOR INTERLOCKED ☐ DOOR MOUNTED
UNLESS SPECIFIED ALL CONTROL CABLES TO BE:
110V 50Hz – 1mmsq RED
0V – 1mmsq BLUE
24VDC +VE – 1mmsq YELLOW
24VDC –VE – 1mmsq BLUE
TELEMETRY – 1mmsq PINK
4–20mA – 2 CORE SCREEN

A	MS	AS	GM	FOR REVIEW & COMMENT	01.06.23
VER.	AUTH.	CHK'D	REV'D	REASON FOR ISSUE	DATE



Customer ALL PUMP SOLUTIONS	
Site Name: HOLLINGWORTH ROAD, LITTLEBOROUGH,ROCHDALE	
Project SSG DUAL PUMP (FORM 4) CONTROL PANEL	
DRAWING TITLE CIRCUIT DIAGRAM OF PUMP No.1 ASD STARTER	
SCALE: N/A	SHEET SIZE A3
DRAWING No. -	REVISION A



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SSG DUAL PUMP (F4)	C

CEMA DRAWING No. QT121852/SW 17 OF 23

CEMA PROJECT ENGINEER
B.EAGER

☒ DOOR INTERLOCKED ☐ DOOR MOUNTED

UNLESS SPECIFIED ALL CONTROL CABLES TO BE:

110V 50Hz	-	1mmsq RED
0V	-	1mmsq BLUE
24VDC +VE	-	1mmsq YELLOW
24VDC -VE	-	1mmsq BLUE
TELEMETRY	-	1mmsq PINK
4-20mA	-	2 CORE SCREEN

ADD WARNING LABEL:

a) 400VAC.

LINE CONTACTOR

1 POLE RELAY

2 POLE RELAY

4 POLE RELAY

1 POLE RELAY	2 POLE RELAY	4 POLE RELAY
(N/C) (C/O)	(N/C) (C/O)	(N/C) (C/O)
(N/C) (C/O)	(N/C) (C/O)	(N/C) (C/O)
(N/C) (C/O)	(N/C) (C/O)	(N/C) (C/O)
(N/C) (C/O)	(N/C) (C/O)	(N/C) (C/O)
(N/C) (C/O)	(N/C) (C/O)	(N/C) (C/O)

A	MS	AS	GM	FOR REVIEW & COMMENT	01.06.23
VER.	AUTH.	CHK'D	REV'D	REASON FOR ISSUE	DATE

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Customer
ALL PUMP SOLUTIONS

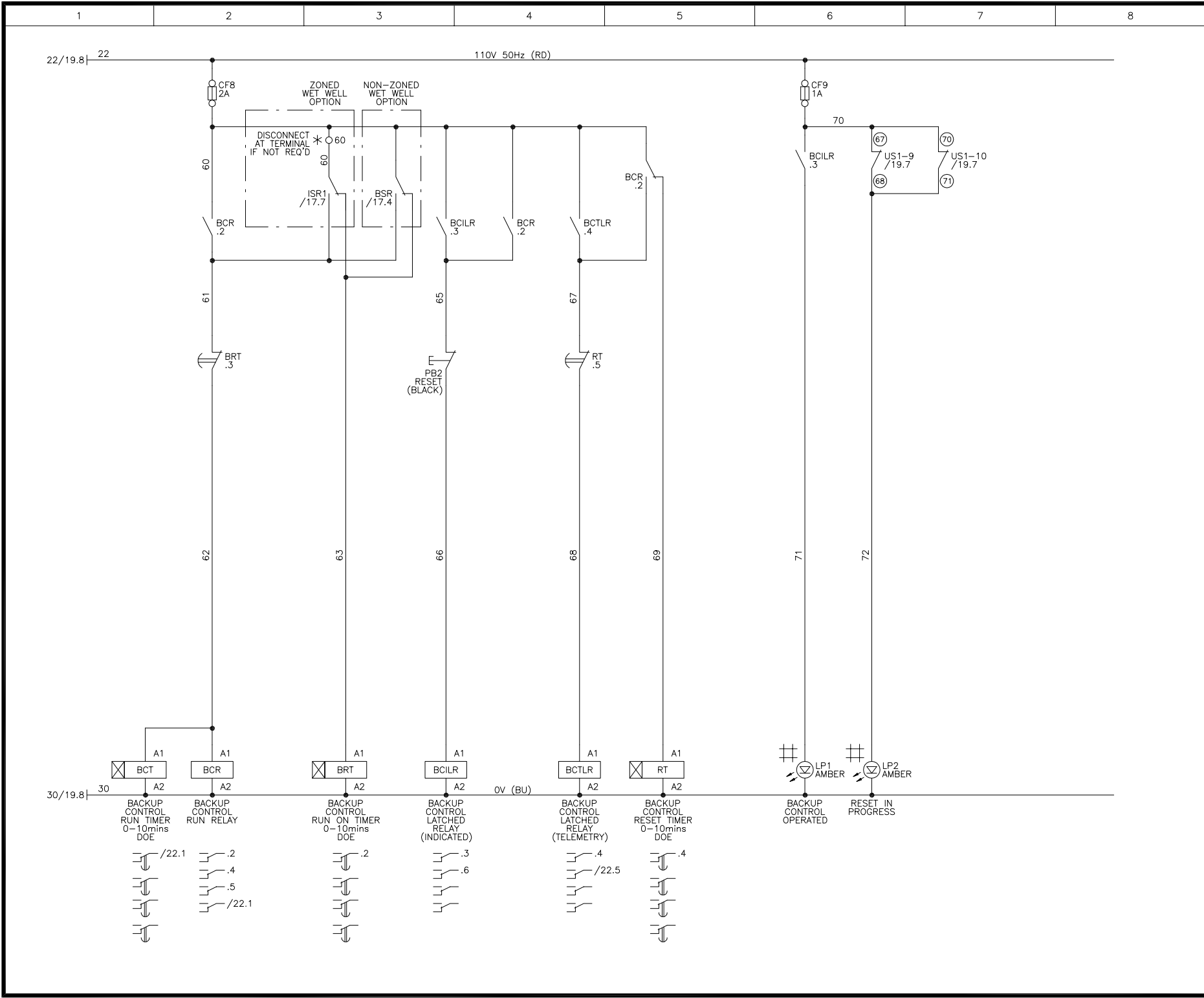
Site Name:
HOLLINGWORTH ROAD,
LITTLEBOROUGH,ROCHDALE

Project
SSG DUAL PUMP (FORM 4)
CONTROL PANEL

DRAWING TITLE
CIRCUIT DIAGRAM OF
COMMON CONTROLS

SCALE: N/A	SHEET SIZE A3
DRAWING No. .	REVISION A

[illegible]





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SSG DUAL PUMP (F4)	C

CEMA DRAWING No.
QT121852/SW

CEMA PROJECT ENGINEER
B.EAGER

☒ DOOR INTERLOCKED ☐ DOOR MOUNTED

UNLESS SPECIFIED ALL CONTROL CABLES TO BE:

110V 50Hz	- 1mmsq RED
0V	- 1mmsq BLUE
24VDC +VE	- 1mmsq YELLOW
24VDC -VE	- 1mmsq BLUE
TELEMETRY	- 1mmsq PINK
4-20mA	- 2 CORE SCREEN

A	MS	AS	GM	FOR REVIEW & COMMENT	01.06.23
VER.	AUTH.	CHK'D	REV'D	REASON FOR ISSUE	DATE



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Site Name:
HOLLINGWORTH ROAD,
LITTLEBOROUGH,ROCHDALE

Project
SSG DUAL PUMP (FORM 4)
CONTROL PANEL

DRAWING TITLE
CIRCUIT DIAGRAM OF
COMMON CONTROLS

SCALE: N/A	SHEET SIZE A3
DRAWING No. .	REVISION A

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SSG DUAL PUMP (F4)	C

CEMA DRAWING No.
QT121852/SW 22 OF 23

CEMA PROJECT ENGINEER

R. FAGER

☒ DOOR INTERLOCKED ☐ DOOR MOUNTED

UNLESS SPECIFIED ALL CONTROL CABLES TO BE:

110V 50Hz	-	1mmsq	RED
0V	-	1mmsq	BLUE
24VDC +VE	-	1mmsq	YELLOW
24VDC -VE	-	1mmsq	BLUE
TELEMETRY	-	1mmsq	PINK
4-20mA	-	2 CORE	SCREEN

TELEMETRY SIGNALS

[illegible]

63 US1-7 61 19.7 111 111 D:111/6.3
 RESET PB1 .1 106 106 D:106/6.3

PUMP No.1
 AUTO RESET
 TO COMP'T D

1mmsg PINK

TEL24VDC

MHT 18.2

1T C/1T C:1T/22.1

2T C/2T C:2T/22.1

3T C/3T C:3T/22.1

4T C/4T C:4T/22.1

5T C/5T C:5T/22.1

6T C/6T C:6T/22.1

7T C/7T C:7T/22.1

8T C/8T C:8T/22.1

LOER 19.3

(21) US1-5 (19) 19.7

POWER FAILED
CLOSED - HEALTHY
OPEN - FAILED (DI01)

WET WELL
HIGH LEVEL
CLOSED - HEALTHY
OPEN - FAILED (DI09)

ULTRASONIC
TX FAILED
CLOSED - HEALTHY
OPEN - FAILED (DI12)

WET WELL
HIGH LEVEL/TIME TO SPILL
CLOSED - HEALTHY
OPEN - FAILED

[illegible][illegible]

A	MS	AS	GM	FOR REVIEW & COMMENT	01.06.23
VER.	AUTH.	CHK'D	REV'D	REASON FOR ISSUE	DATE



Customer
ALL PUMP SOLUTIONS

Site Name:
HOLLINGWORTH ROAD,
LITTLEBOROUGH,ROCHDALE

Project	SSG DUAL PUMP (FORM 4)
	CONTROL PANEL

DRAWING TITLE
CIRCUIT DIAGRAM OF
COMMON CONTROLS

SCALE: N/A	SHEET SIZE A3
DRAWING No. .	REVISION A

