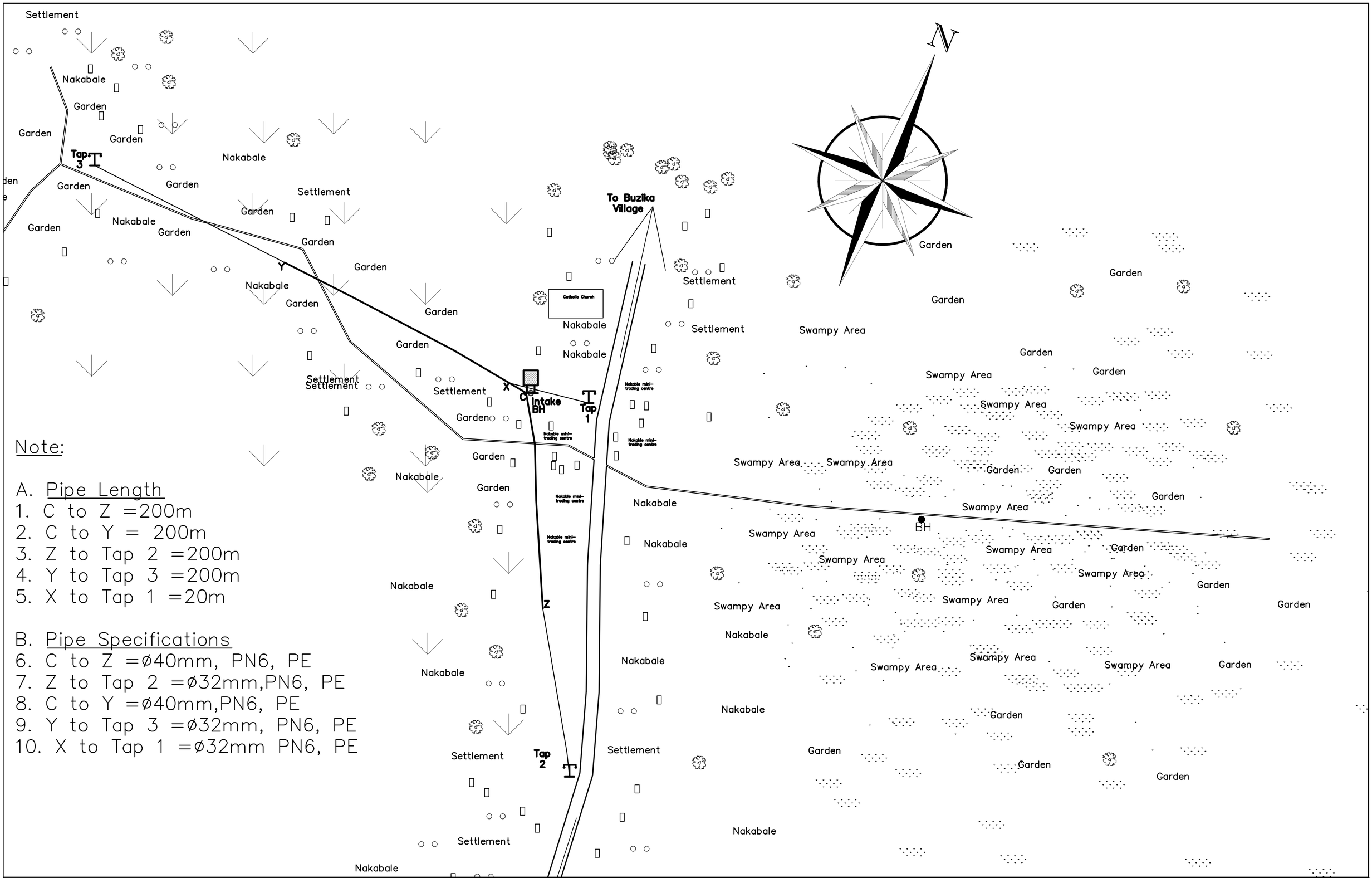
Design Drawings, PV and Pump Sizing Reports for Community Tapstands to be Constructed in Bugiri & Namayingo Districts (Eastern Uganda)

The following list of Design Drawings, PV and Pump Sizings are Appended:

1.	Drawing 1:	Layout Map of Nakable Community Tapstand(Bugiri District)
2.	Drawing 2:	Layout Map of Nabukalu Community Tapstand(Bugiri District)
3.	Drawing 3:	Layout Map of Bulesa Community Tapstand(Bugiri District)
4.	Drawing 4:	Layout Map of Nansuma B Community Tapstand(Namayingo District)
5.	Drawing 5:	Layout Map of Mukorobi Community Tapstand(Namayingo District
6.	Drawing 6:	Reservoir/Water Tank, Pump House and Solar Mounting Structure Details
7.	Drawing 7:	Fencing Details
8	Drawing 8:	Public Tap Stand Details
9	Drawing 9:	Trenching Details
10	Drawing 10:	Marker Post Details
	11:	PV & Pump Sizing for Nakable Report
	12:	PV & Pump Sizing for Nabukalu Report
	13:	PV & Pump Sizing for Bulesa Report
	14:	PV & Pump Sizing for Nansuma B Report
	15:	PV & Pump Sizing for Mukorobi Report

October 2021



Note:

A. Pipe Length
1. C to Z =200m
2. C to Y = 200m
3. Z to Tap 2 =200m
4. Y to Tap 3 =200m
5. X to Tap 1 =20m

B. Pipe Specifications
6. C to Z =ø40mm, PN6, PE
7. Z to Tap 2 =ø32mm,PN6, PE
8. C to Y =ø40mm,PN6, PE
9. Y to Tap 3 =ø32mm, PN6, PE
10. X to Tap 1 =ø32mm PN6, PE

LEGEND

Simplified Layout Map of Nakabale Community Tapstand in Nabukalu Sub-county; Bugiri District

GOAL

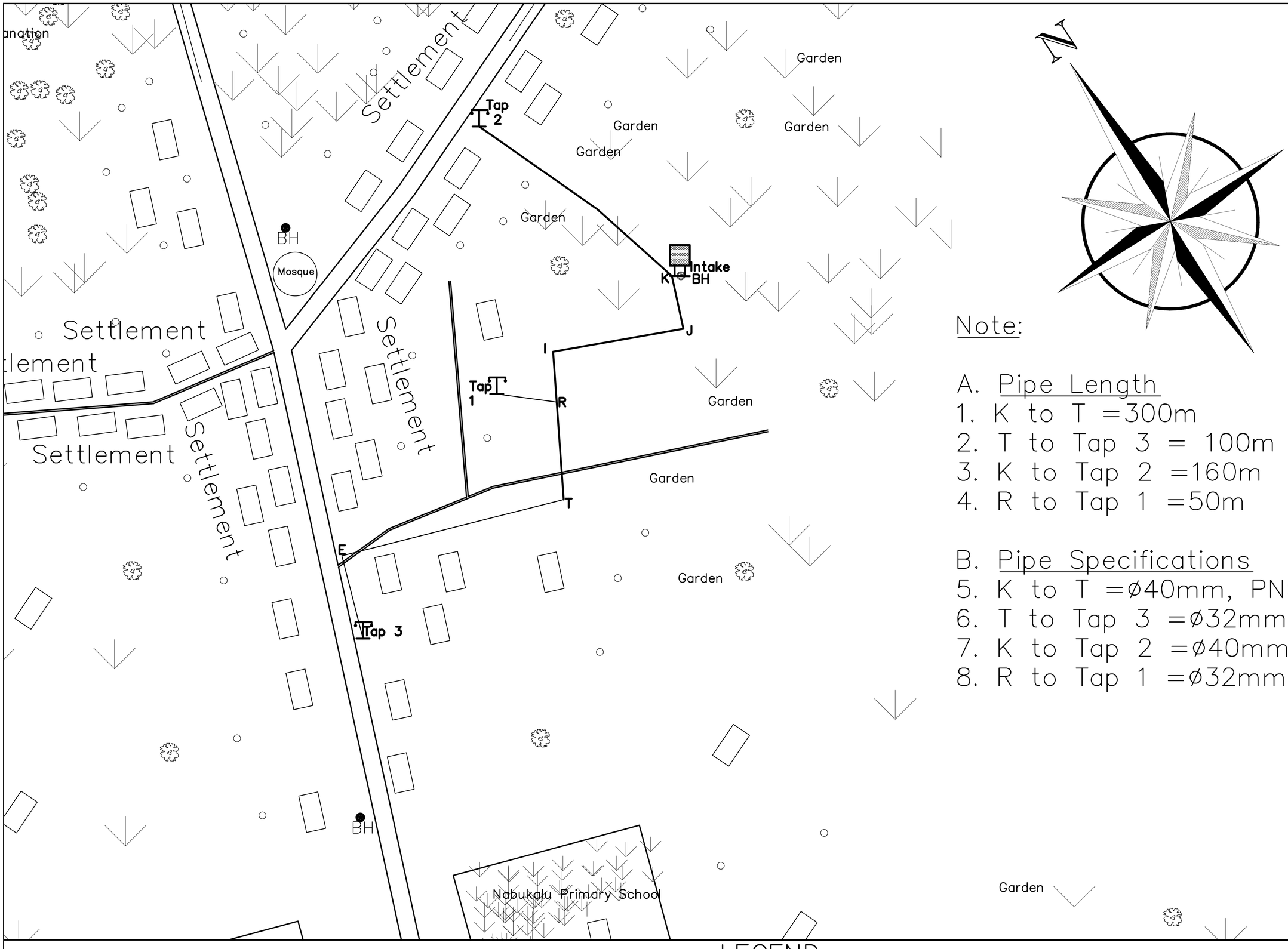
...Roads/Footpaths
...Trees
...Public Stand Tap
BH ...Existing Borehole
...Buildings
...Huts
...Distribution line
...Reservoir &Intake

1.Reservoir Height.....5
2.Reservoir Capacity.....8m^3
3.GI Reservoir inlet pipe.....ø50mm
4.GI Reservoir outlet pipe.....ø40mm
5.GI Public Stand tap.....ø20mm
6.Pipe Burial Depth....1m
7.GI Reservoir Wash-out pipe....ø40mm
8.intake land size....6x6m

Surveyed By: OJ & AA
Drawn By: OJ
Checked By: JA
Scale: To Fit

Date: October 2021

Drawing No: 1



N

Note:

A. Pipe Length
1. K to T =300m
2. T to Tap 3 = 100m
3. K to Tap 2 =160m
4. R to Tap 1 =50m

B. Pipe Specifications
5. K to T =ø40mm, PN6, PE
6. T to Tap 3 =ø32mm,PN6, PE
7. K to Tap 2 =ø40mm,PN6, PE
8. R to Tap 1 =ø32mm, PN6, PE

LEGEND

Simplified Layout Map of Nabukalu Community Tapstand in Nabukalu Sub-county; Bugiri District

GOAL

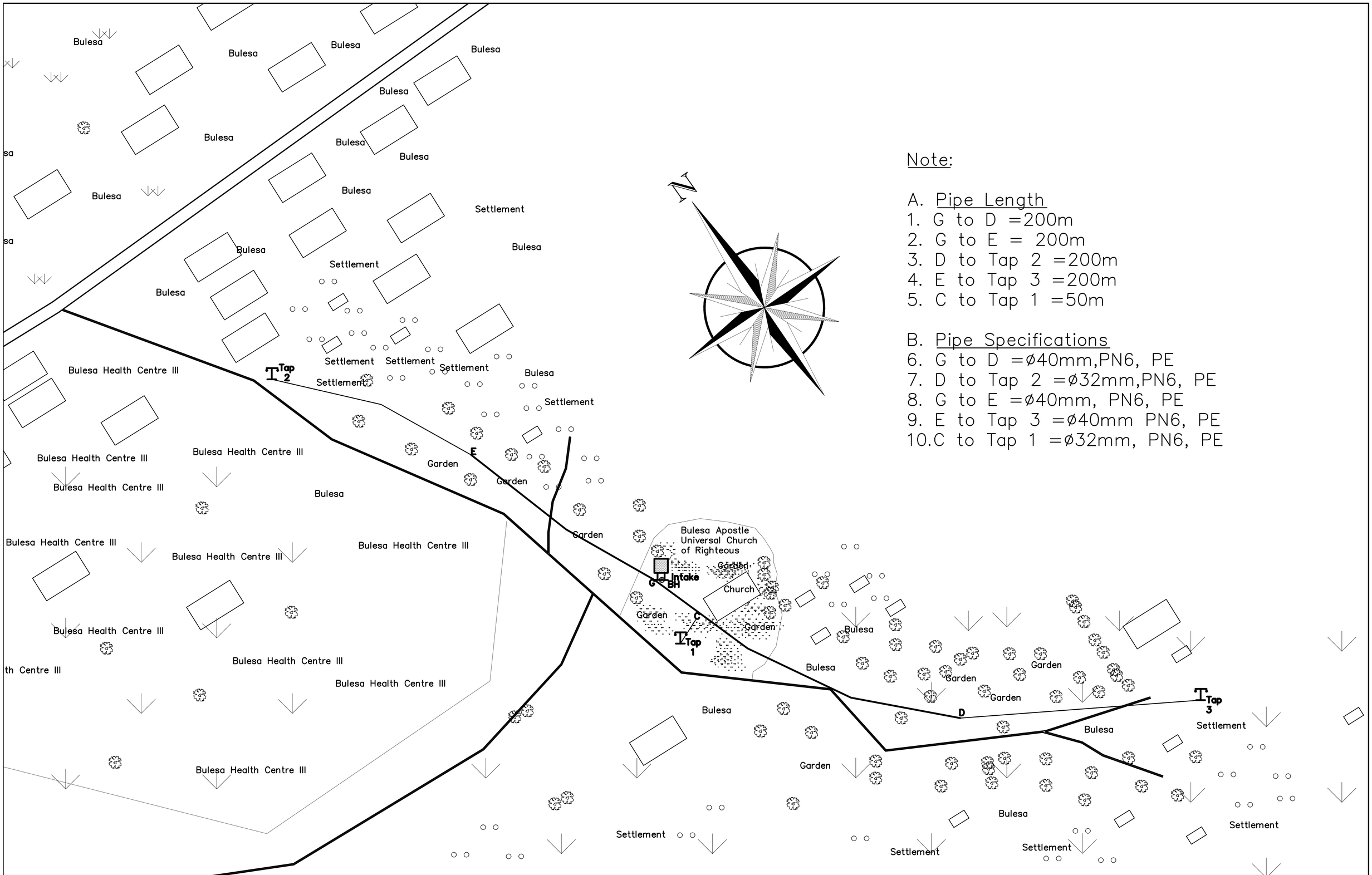
...Roads/Footpaths
...Trees
...Public Stand Taps
BH ...Existing Borehole
...Buildings
...Huts
...Distribution line
...Reservoir &Intake

1.Reservoir Height.....5m
2.Reservoir Capacity.....8m^3
3.GI Reservoir inlet pipe.....ø50mm
4.GI Reservoir outlet pipe.....ø40mm
5.GI Public Stand tap.....ø20mm
6.Pipe Burial Depth....1m
7.GI Reservoir Wash-out pipe....ø40mm
8.intake land size....6x6m

Surveyed By: OJ & AA
Drawn By: OJ
Checked By: JA
Scale: To Fit

Date: October 2021

Drawing No: 2



Note:

A. Pipe Length
1. G to D =200m
2. G to E = 200m
3. D to Tap 2 =200m
4. E to Tap 3 =200m
5. C to Tap 1 =50m

B. Pipe Specifications
6. G to D =ø40mm,PN6, PE
7. D to Tap 2 =ø32mm,PN6, PE
8. G to E =ø40mm, PN6, PE
9. E to Tap 3 =ø40mm PN6, PE
10. C to Tap 1 =ø32mm, PN6, PE

LEGEND

Simplified Layout Map of Bulesa Community Tapstand in Bulesa Sub-county; Bugiri District

GOAL

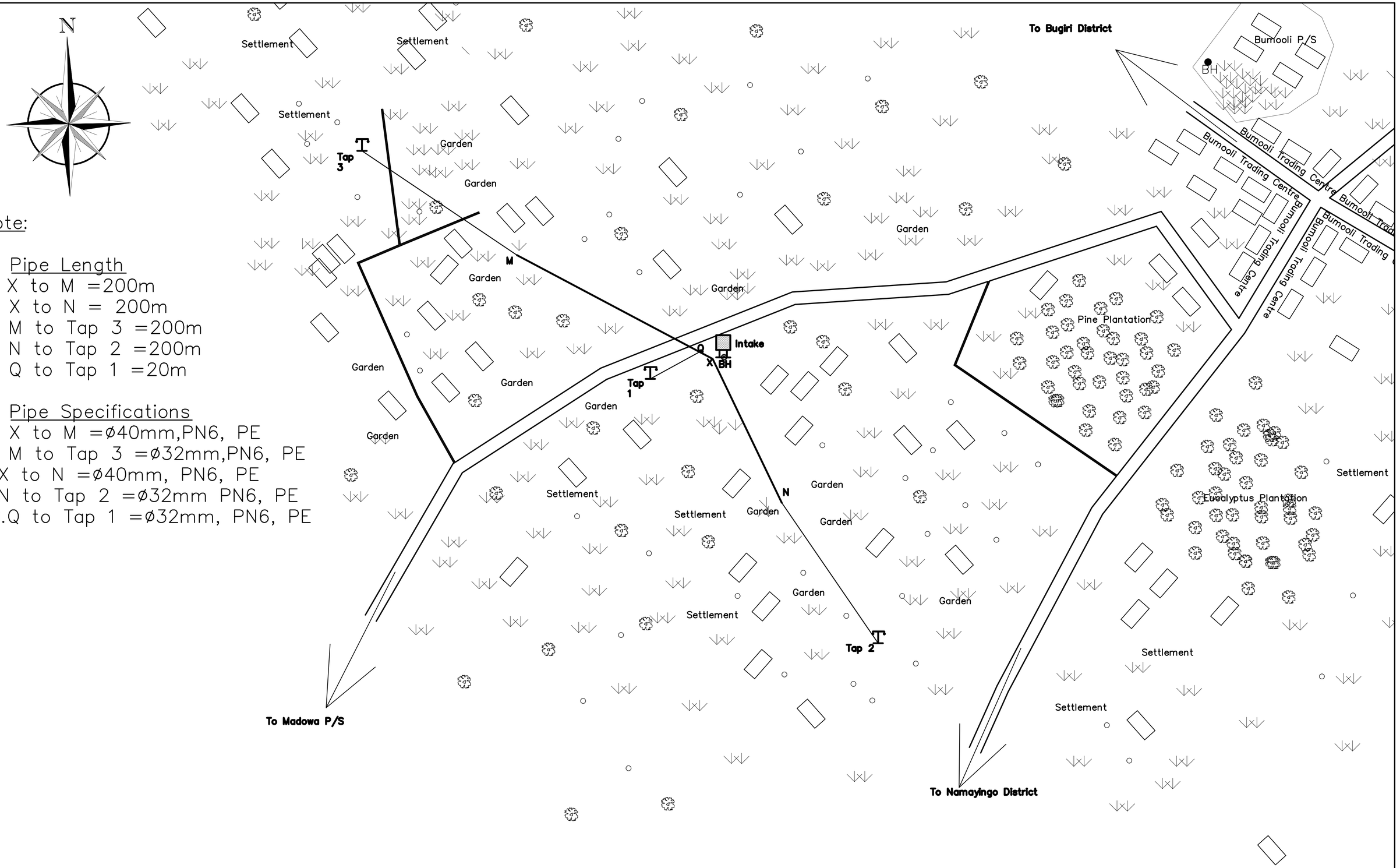
...Roads/Footpaths
...Trees
...Public Stand Taps
...Borehole
...Buildings
...Huts
...Distribution line
...Reservoir &Intake

1.Reservoir Height.....5m
2.Reservoir Capacity.....8m^3
3.GI Reservoir inlet pipe.....ø50mm
4.GI Reservoir outlet pipe.....ø40mm
5.GI Public Stand tap.....ø20mm
6.Pipe Burial Depth....1m
7.GI Reservoir Wash-out pipe....ø40mm
8.intake land size....6x6m

Surveyed By: OJ & AA
Drawn By: OJ
Checked By: JA
Scale: To Fit

Date: October 2021

Drawing No: 3



Note:

A. Pipe Length
1. X to M =200m
2. X to N = 200m
3. M to Tap 3 =200m
4. N to Tap 2 =200m
5. Q to Tap 1 =20m

B. Pipe Specifications
6. X to M =ø40mm,PN6, PE
7. M to Tap 3 =ø32mm,PN6, PE
8.X to N =ø40mm, PN6, PE
9.N to Tap 2 =ø32mm PN6, PE
10.Q to Tap 1 =ø32mm, PN6, PE

LEGEND

Simplified Layout Map of Nansuma B CTS Community Tapstand in Buswale Sub-county; Namayingo District

GOAL

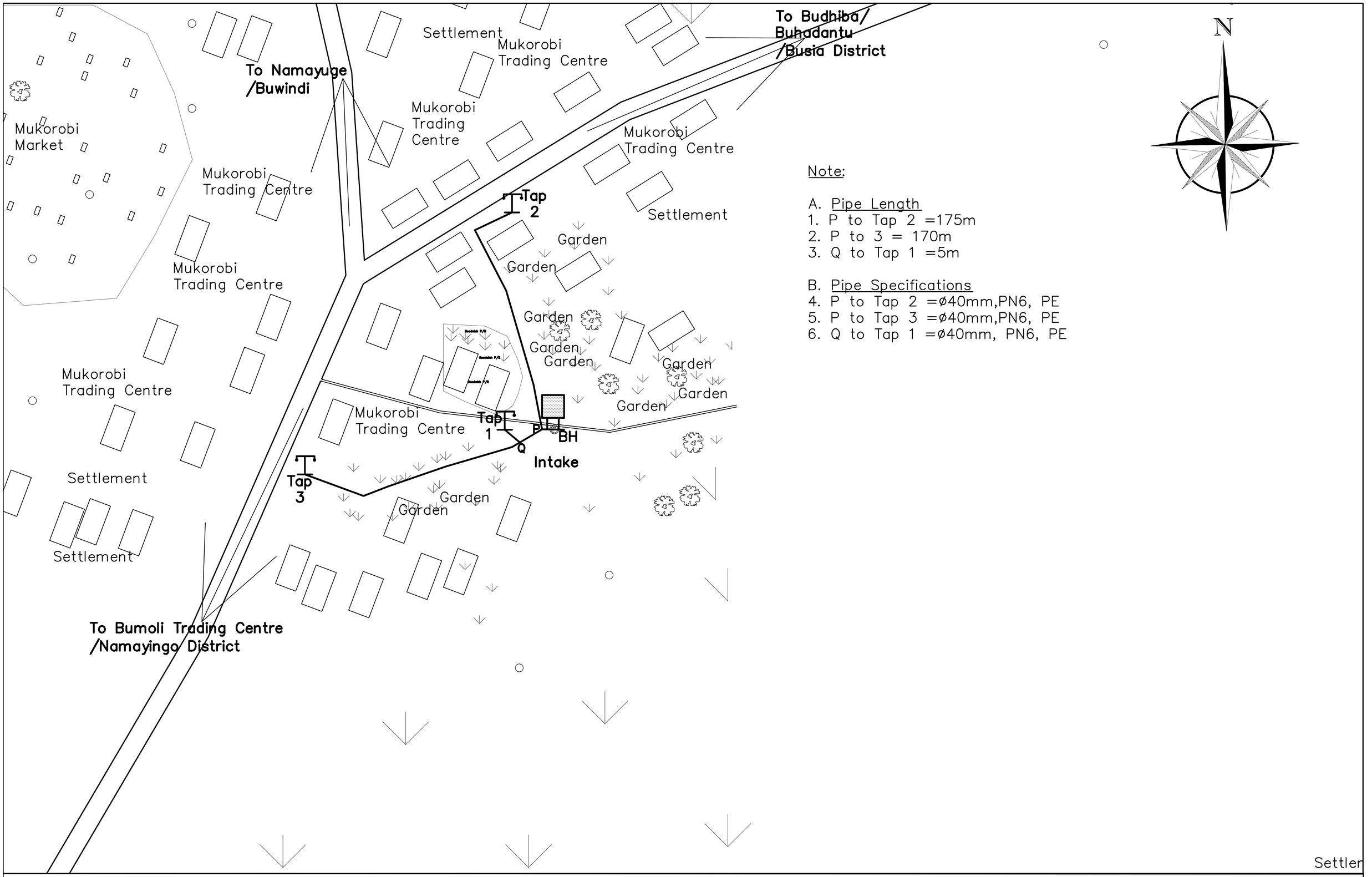
...Roads/Footpaths
...Trees
...Public Stand Taps
...Boreholes
...Buildings
...Huts
...Distribution line
...Reservoir &Intake

1.Reservoir Height.....5m
2.Reservoir Capacity.....8m^3
3.GI Reservoir inlet pipe.....ø50mm
4.GI Reservoir outlet pipe.....ø40mm
5.GI Public Stand tap.....ø20mm
6.Pipe Burial Depth....1m
7.GI Reservoir Wash-out pipe....ø40mm
8.intake land size....6x6m

Surveyed By: OJ & AA
Drawn By: OJ
Checked By: JA
Scale: To Fit

Date: October 2021

Drawing No: 4



Note:

A. Pipe Length
1. P to Tap 2 =175m
2. P to 3 = 170m
3. Q to Tap 1 =5m

B. Pipe Specifications
4. P to Tap 2 =ø40mm,PN6, PE
5. P to Tap 3 =ø40mm,PN6, PE
6. Q to Tap 1 =ø40mm, PN6, PE

LEGEND

Simplified Topographic Map of Mukorobi Community Tapstand in Buswale Sub-county; Namayingo District

GOAL

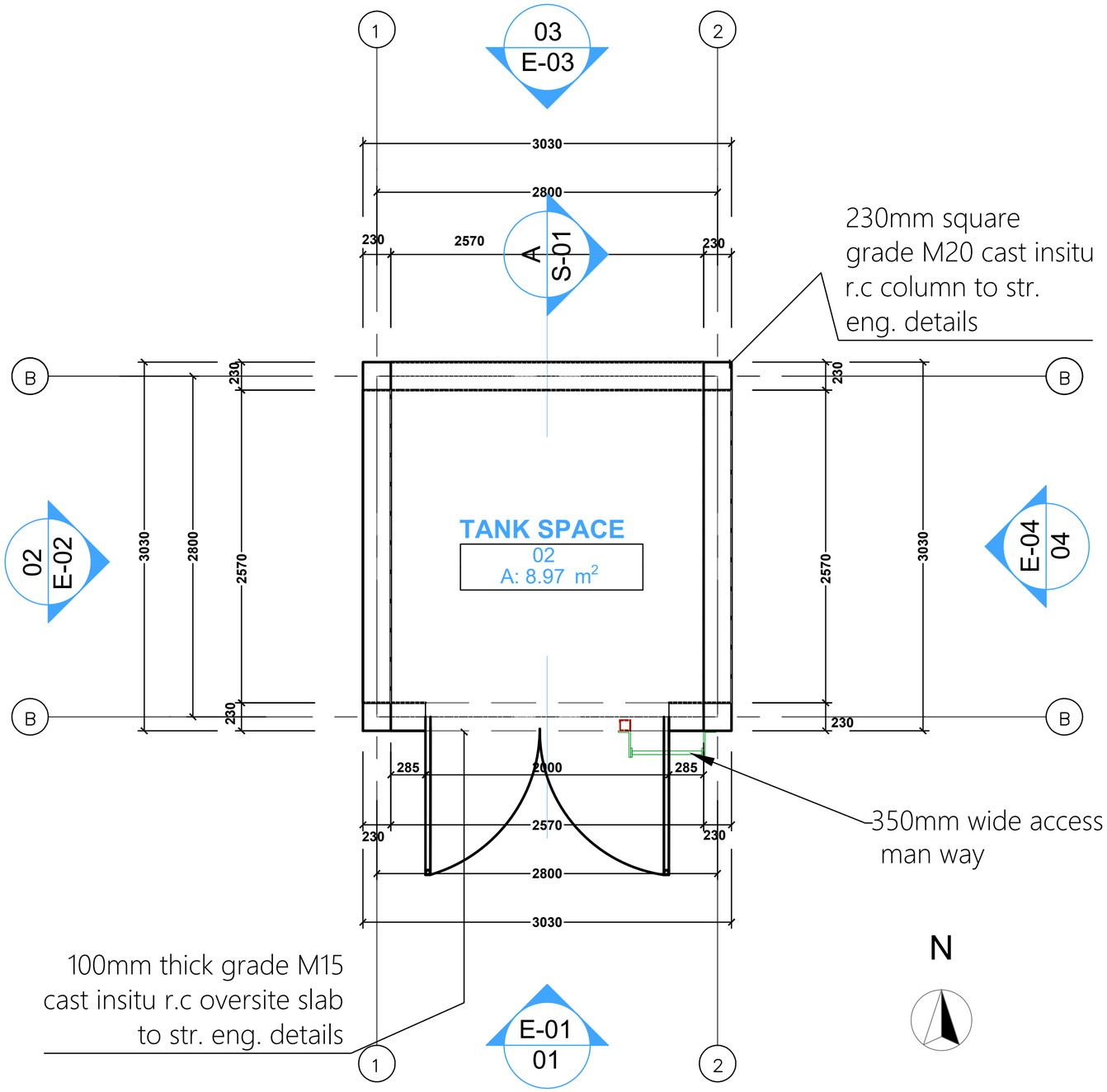
...Roads/Footpaths
...Trees
...Public Stand Taps
...Boreholes
...Buildings
...Huts
...Distribution line
...Reservoir &Intake

1.Reservoir Height.....5m
2.Reservoir Capacity.....8m^3
3.GI Reservoir inlet pipe.....ø50mm
4.GI Reservoir outlet pipe.....ø40mm
5.GI Public Stand tap.....ø20mm
6.Pipe Burial Depth....1m
7.GI Reservoir Wash-out pipe....ø40mm
8.intake land size....6x6m

Surveyed By: OJ & AA
Drawn By: OJ
Checked By: JA
Scale: To Fit

Date: October 2021

Drawing No: 5

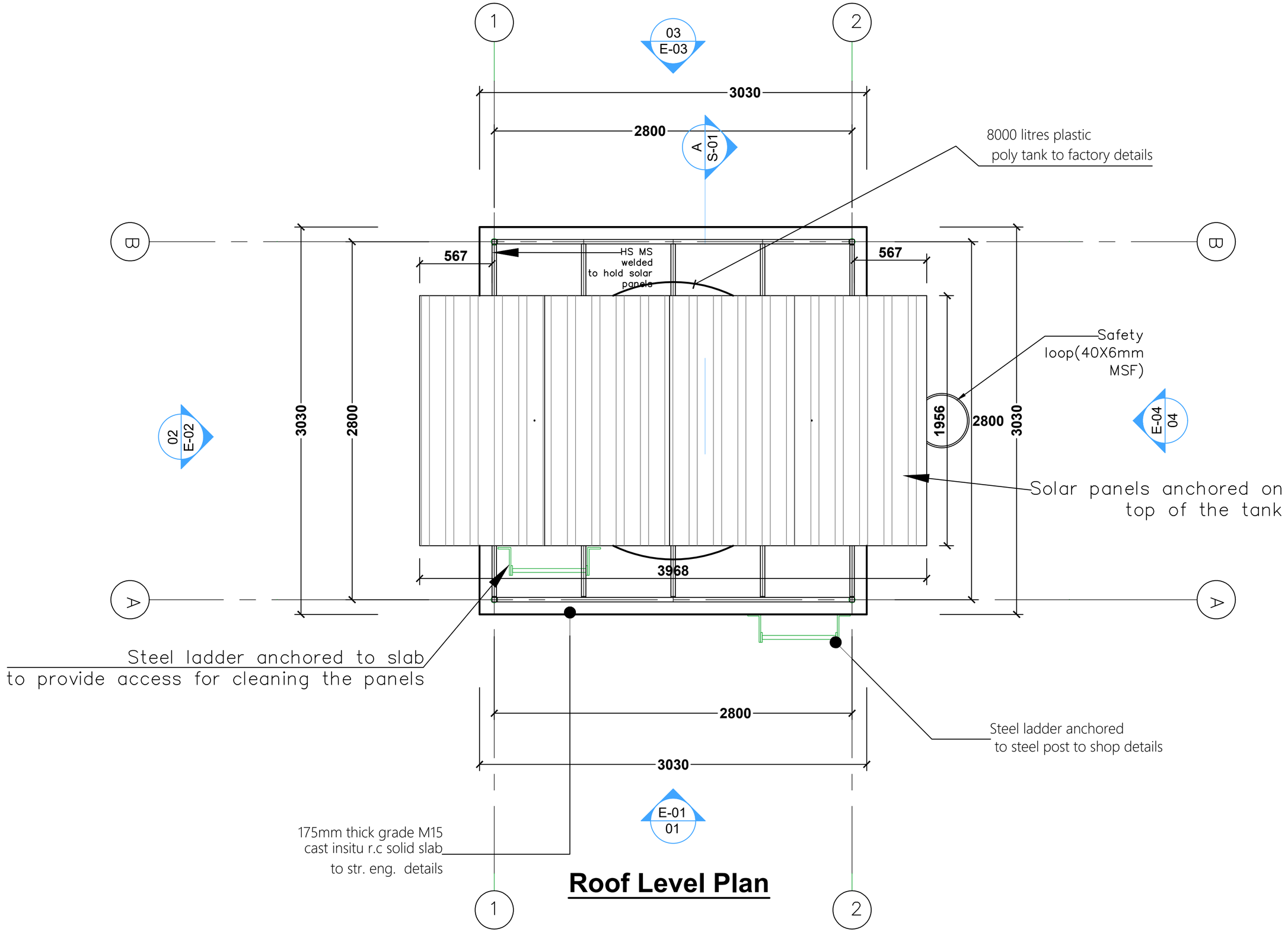


Ground Floor Level Plan

GOAL	Designed & Drawn: OJ	Date: November 2020	Drawing No: 6	Revised: OJ
	Checked: JA	Page: 1 of 11		Date: October 2021
PROJECT: Community Tapstand Project in Bugiri & Namayingo Districts	Scale: NTS	Title: Ground Floor Level Plan for the Tank		

GENERAL NOTES:

1. Unless otherwise stated dimensions are in millimetres (mm)
2. Do not scale off drawings
3. All levels and dimensions to be checked on site before cutting or bending of steel



Roof Level Plan

GOAL	Designed & Drawn: OJ	Date: November 2020	Drawing No: 6	Revised: OJ
	Checked: JA	Page: 2 of 11		Date: October 2021
PROJECT: Community Tapstand Project in Bugiri & Namayingo Districts	Scale: NTS	Title: Roof Plan(Tank)		

GENERAL NOTES:

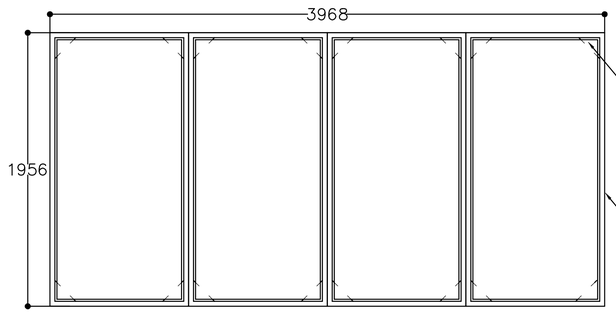
1. Unless otherwise stated dimensions are in millimetres (mm)
2. Do not scale off drawings
3. All levels and dimensions to be checked on site before cutting or bending of steel

NOTES

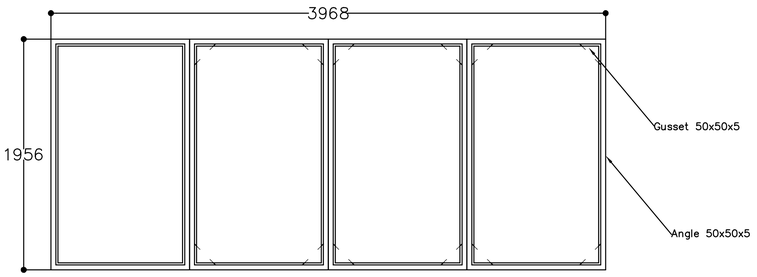
1.The solar panels shall be sloped at 15degrees.

2.The solar panels shall face towards the equator

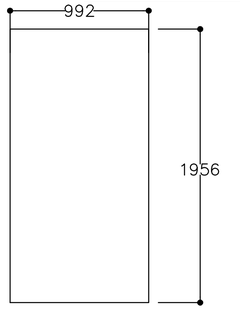
3.All steel to steel connections shall be welded all round unless indicated for bolted connections



Solare Array: 4 in total and each has a dimension 992x1956X40mm. This is for Bulesa, Mukorobi, Nakabale & Nansuma-B Community Tapstands



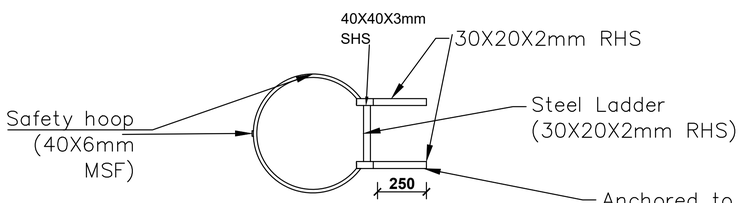
Solare Array: 3 in total and each has a dimension 992x1956X40mm. This is for Nabukalu Community Tap stand



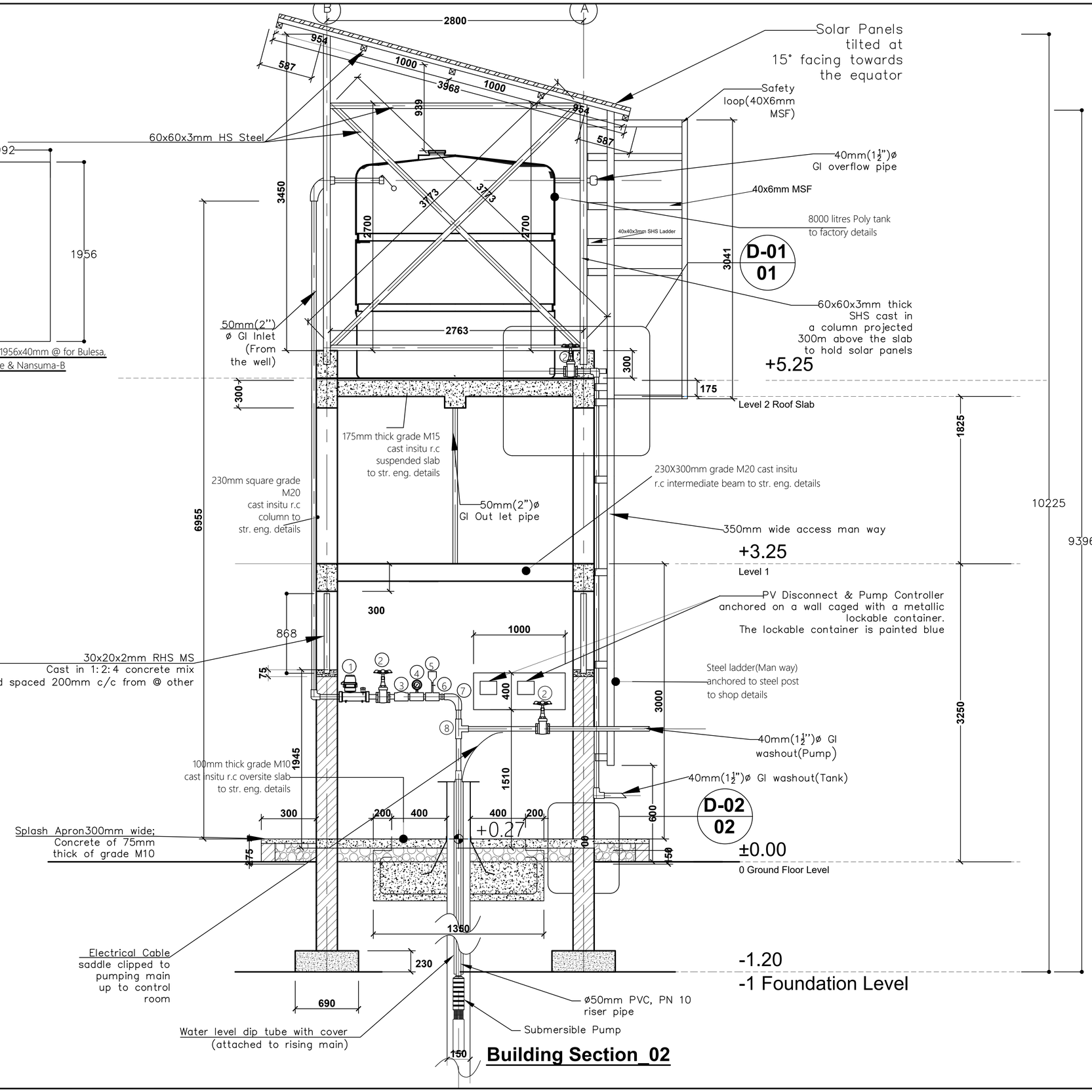
Solar Pannel Dimension: 992x1956x40mm @ for Bulesa, Mukorobi, Nabukalu, Nakabale & Nansuma-B Community Tapstands

Fitting Schedules:

1). 1No. ND50mm Bulk meter
2). 3No. ND50mm & 1No. ND40mm Double Socket Gate Valve
3). 1No. ND50mm Non Return Valve
4). 1No. ND50/25mm GMS Tee for Pressure Gauge
5). 1No. ND5O/25mm GMS Tee for Air Valve
6). 1No. ND50mm Nipple
7). 1No. ND50 Double socket long radius bend
8). 1No. ND50/40mm GMS Tee for Wash out pipe



SAFETY LOOP DETAILS

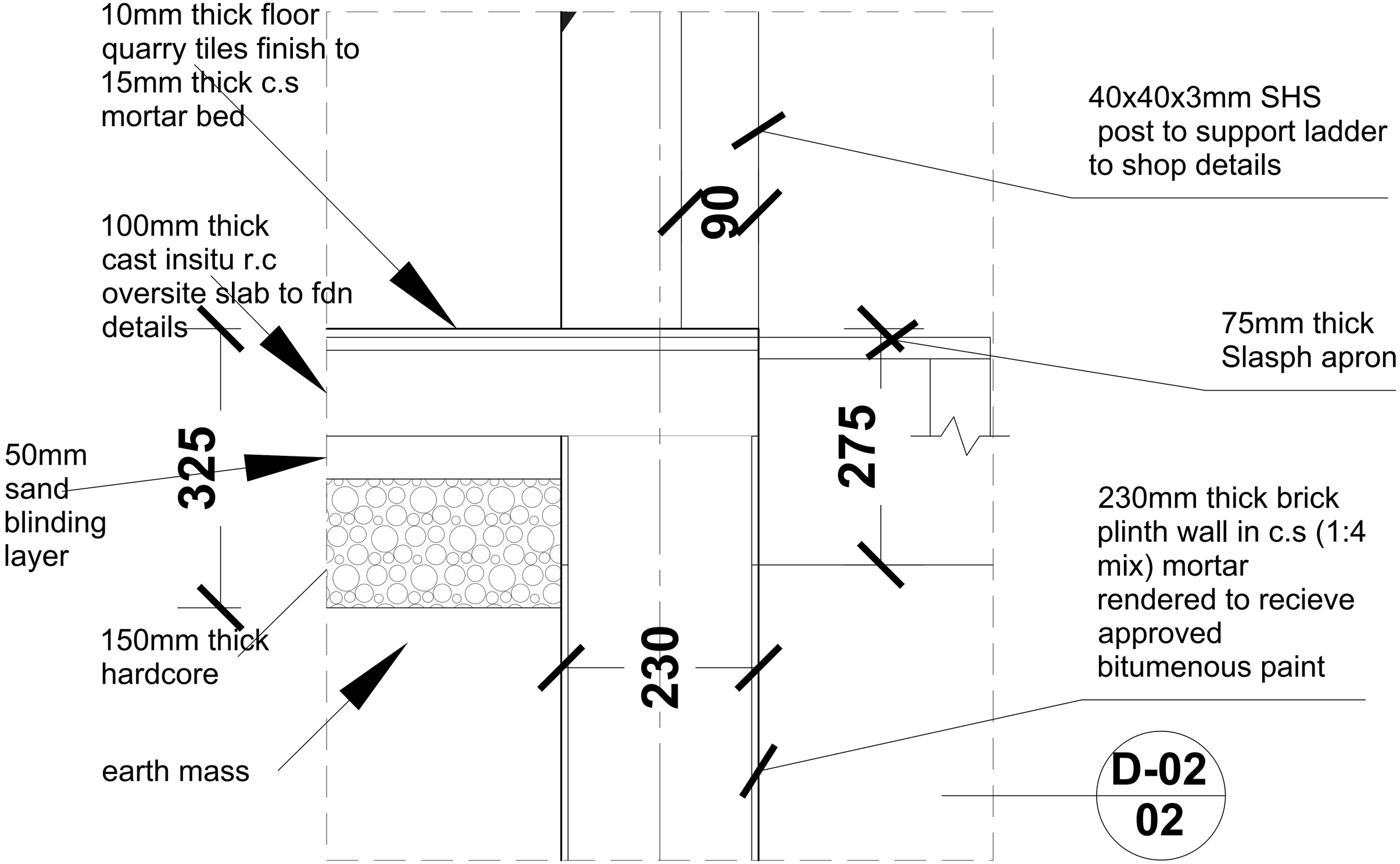


Building Section_02

GOAL	Design & Drawned: OJ	Date: November 2020	Drawing No: 6	Revised: OJ
	Checked: JA	Page: 3 of 11		Date: October 2021
PROJECT: Community Tapstand Project in Bugiri & Namayingo Districts	Scale: NTS	Title: Building Section 02		

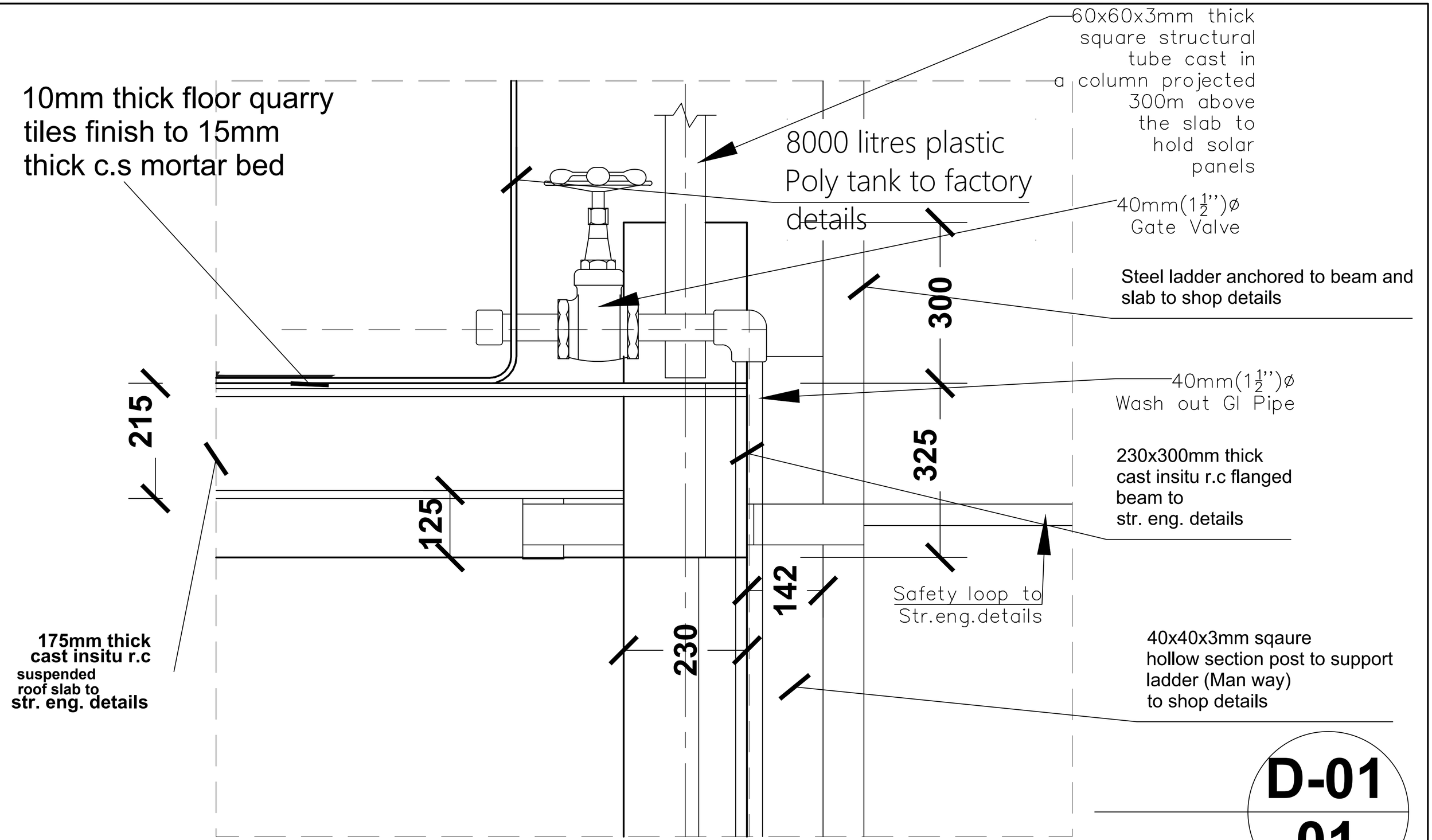
GENERAL NOTES:

1. Unless otherwise stated dimensions are in millimetres (mm)
2. Do not scale off drawings
3. All levels and dimensions to be checked on site before cutting or bending of steel



Plinth Section Details

GOAL	Designed & Drawn: OJ	Date: November 2020	Drawing No: 6	Revised: OJ	GENERAL NOTES: 1. Unless otherwise stated dimensions are in millimetres (mm) 2. Do not scale off drawings 3. All levels and dimensions to be checked on site before cutting or bending of steel
	Checked: JA	Page: 4 of 11		Date: October 2021	
PROJECT: Community Tapstand Project in Bugiri & Namayingo Districts	Scale: NTS	Title: Tank (Plinth Section Details)			

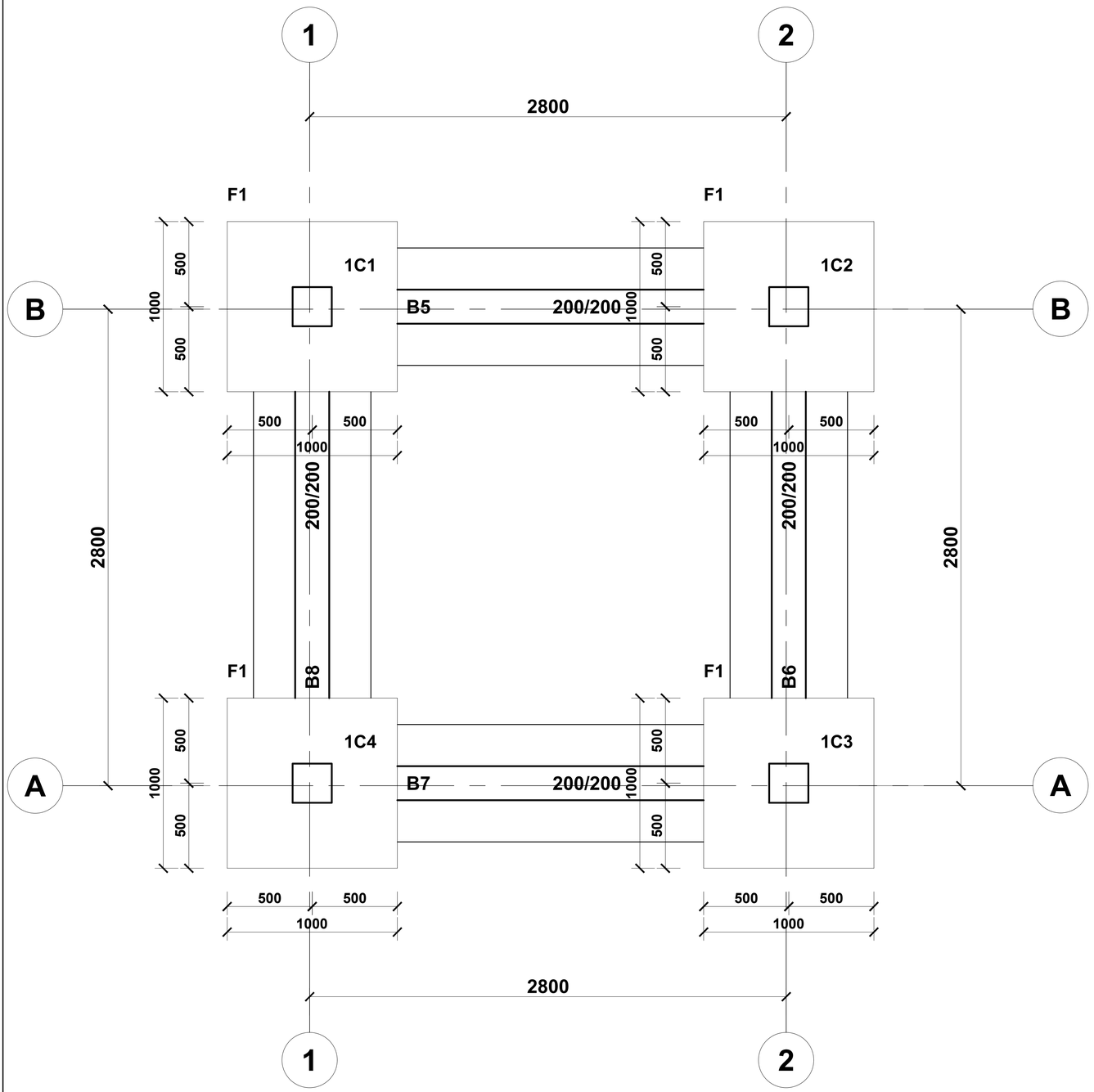


Roof Section Details

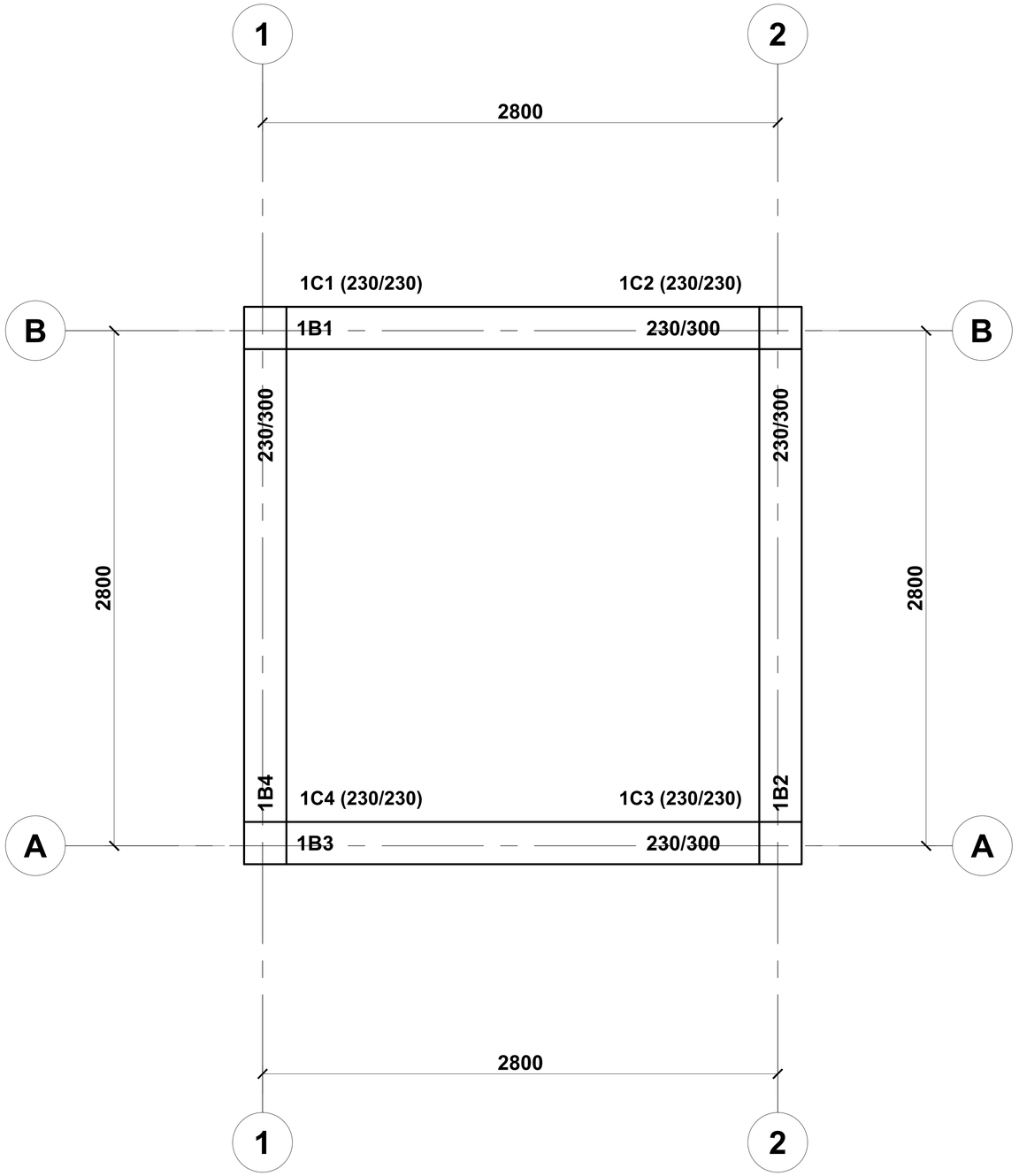
D-01
01

GOAL	Designed & Drawn: OJ	Date: November 2020	Drawing No: 6	Revised: OJ	
	Checked: JA	Page: 5 of 11		Date: October 2021	
PROJECT: Community Tapstand Project in Bugiri & Namayingo Districts	Scale: NTS	Title: Tank(Roof Section Details)			

GENERAL NOTES:
1. Unless otherwise stated dimensions are in millimetres (mm)
2. Do not scale off drawings
3. All levels and dimensions to be checked on site before cutting or bending of steel



FOUNDATION LAYOUT & R C.STRUCTURAL DETAILS



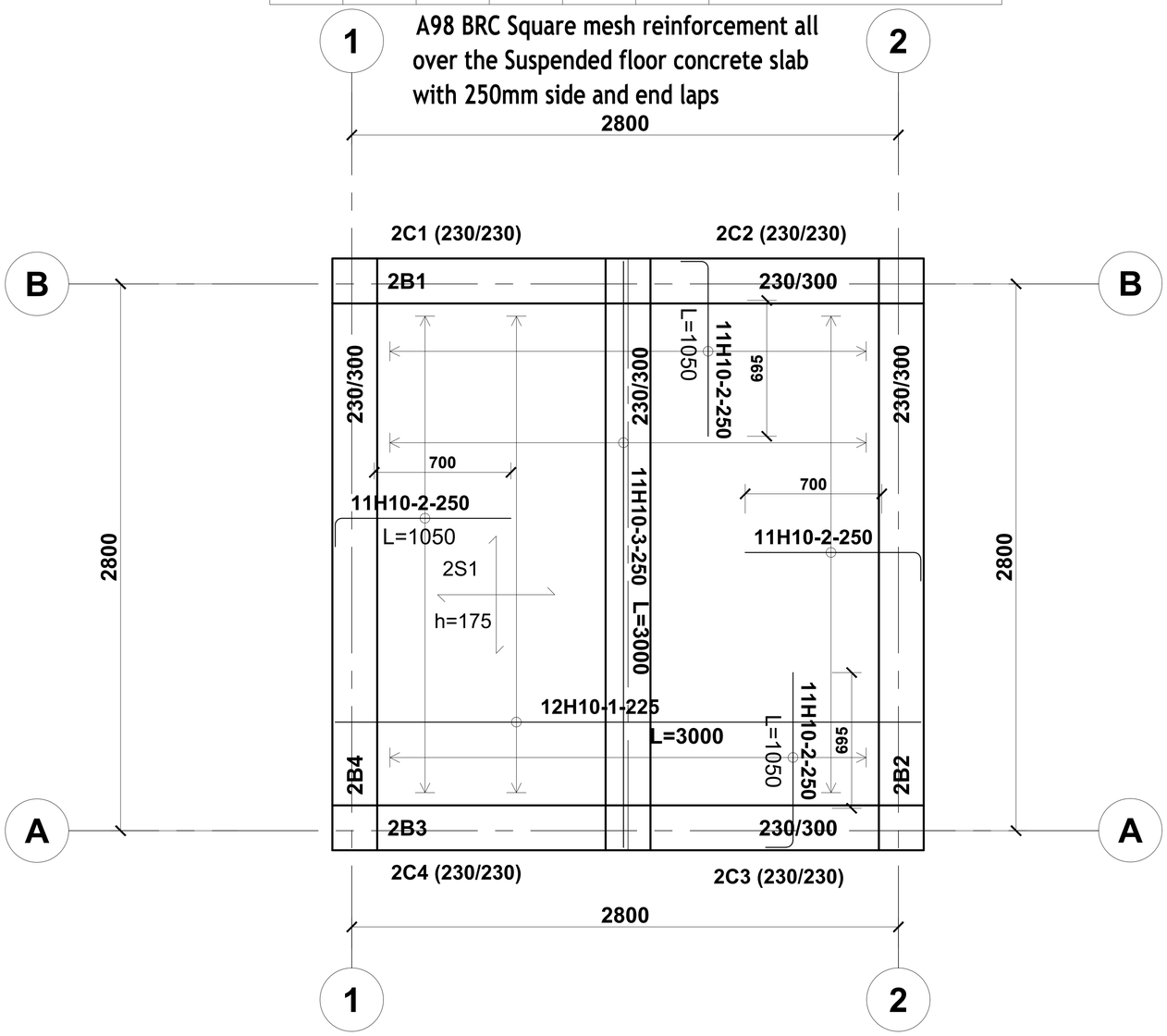
LEVEL 1 LAYOUT & R C.STRUCTURAL DETAILS

GOAL	Designed & Drawn: OJ	Date: November 2020	Drawing No: 6	Revised: OJ
	Checked: JA	Page: 6 of 11		Date: October 2021
PROJECT: Community Tapstand Project in Bugiri & Namayingo Districts	Scale: NTS	Title: Foundation & First Floor Layouts		

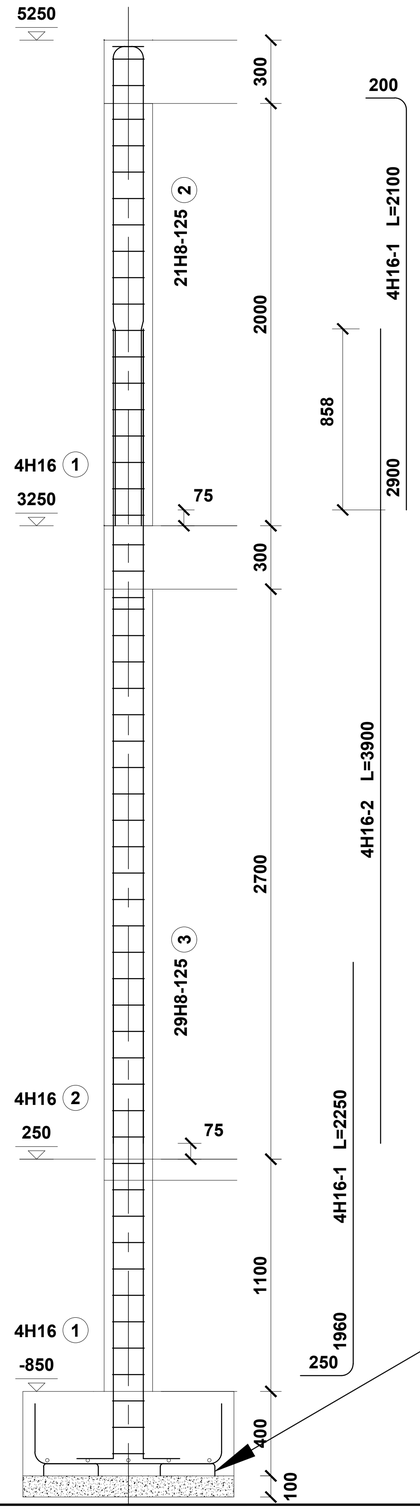
GENERAL NOTES:
1. Unless otherwise stated dimensions are in millimetres (mm)
2. Do not scale off drawings
3. All levels and dimensions to be checked on site before cutting or bending of steel
4. All reinforced concrete is in accordance with structural engineer's details

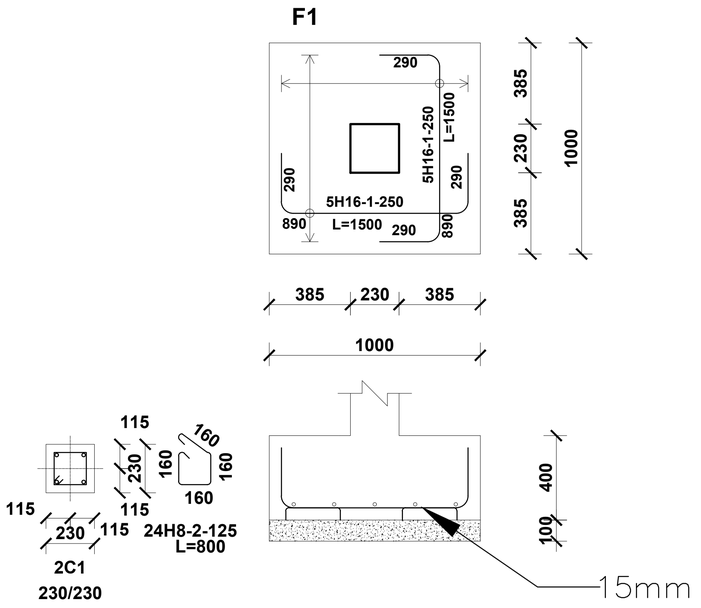
STEEL SCHEDULE - 2. STOREY SLABS					
TYPE mm	UNIT WGT (kg/m)	TOTAL LEN (m)	TOTAL WEIGHT (kg)		
H10	0.6165	115.2	71.0		
GRAND TOTAL			71.0		

POS	TYPE mm	QTY	LEN mm	TOT (m)	SHP	MEMBERS
1	H10	24	3000	36.0	00	
2	H10	88	1050	46.2	11	
3	H10	22	3000	33.0	00	



LEVEL 2 ROOF SLAB LAYOUT & R C.STRUCTURAL DETAILS

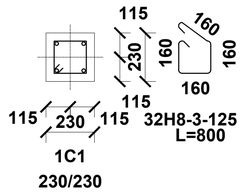




STEEL SCHEDULE - SHEET: 1						
TYPE mm	UNIT WGT (kg/m)	TOTAL LENGTH (m)	TOTAL WEIGHT (kg)			
H16	1.5783	15	23.7			
GRAND TOTAL			23.7			

POS	TYPE mm	QTY	LEN mm	TOT (m)	SHP	MEMBERS
1	H16	12	1500	15.0	21	

PAD FOOTING & R C.STRUCTURAL DETAILS

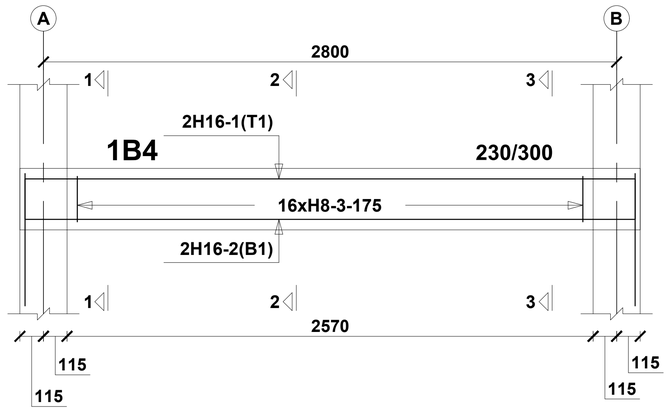


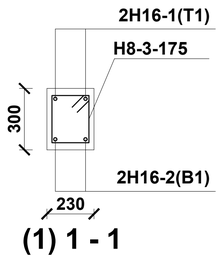
COLUMN ELEVATIONS & R C.STRUCTURAL DETAILS

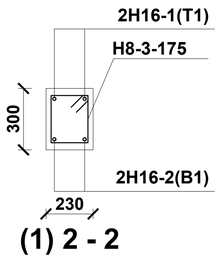
GOAL

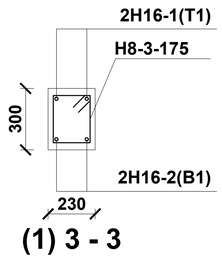
Designed & Drawn: OJ	Date: November 2020	Drawing No: 6	Revised: OJ
Checked: JA	Page: 7 of 11		Date: October 2021
PROJECT: Community Tapstand Project in Bugiri & Namayingo Districts	Scale: NTS	Title: Slabs & Column Details	

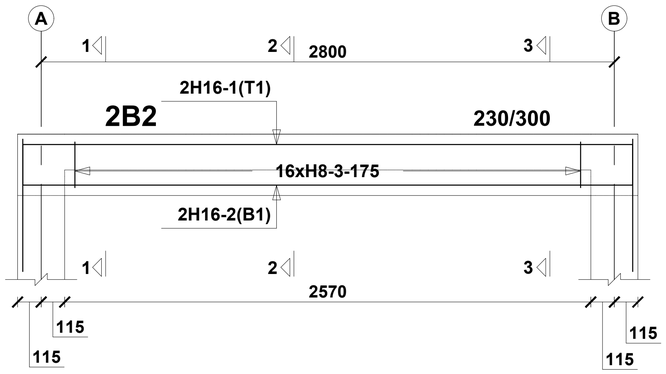
GENERAL NOTES:
1. Unless otherwise stated dimensions are in millimetres (mm)
2. Do not scale off drawings
3. All levels and dimensions to be checked on site before cutting or bending of steel
4. All reinforced concrete is in accordance with structural engineer's details

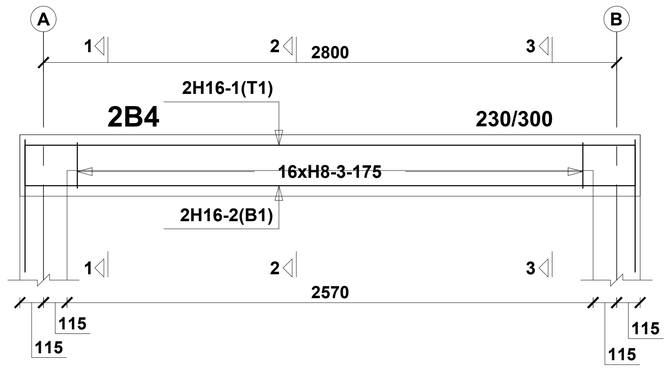


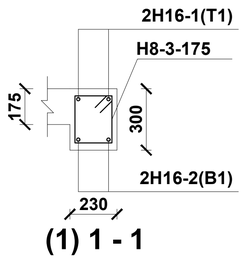


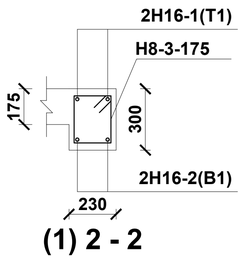


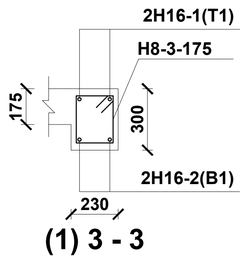


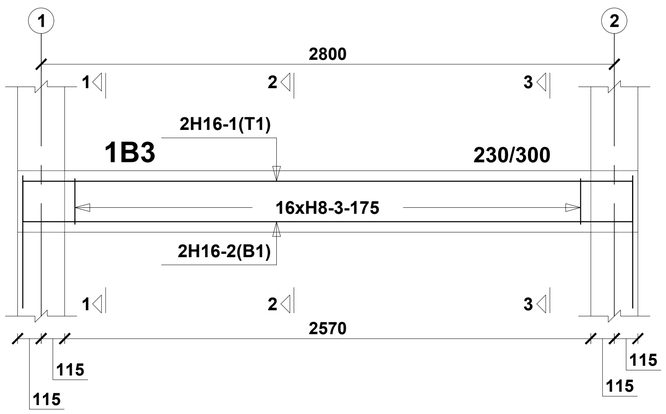


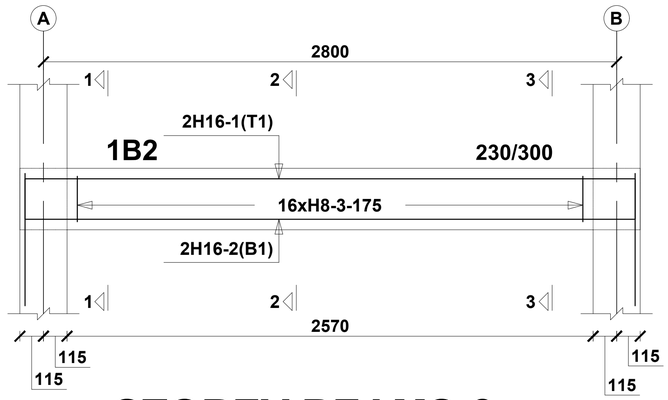


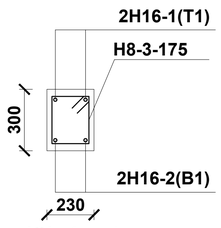


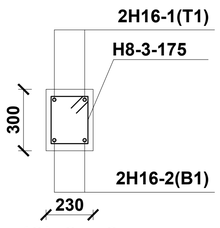


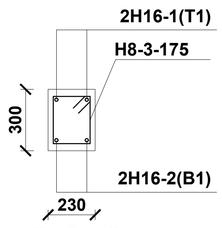


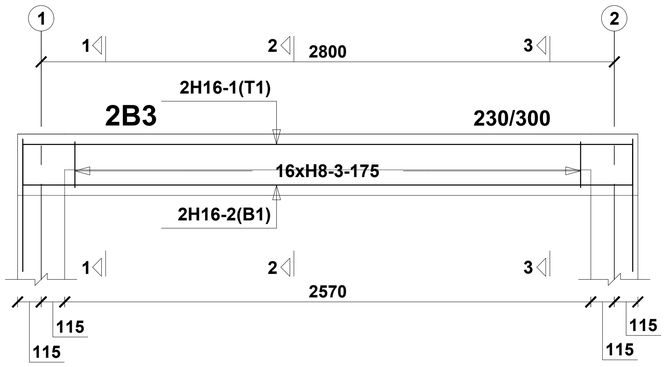








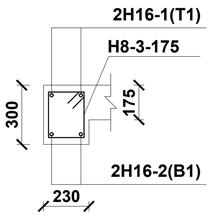




STOREY BEAMS & R C.STRUCTURAL DETAILS

GOAL	Designed & Drawn: OJ	Date: November 2020	Drawing No: 6	Revised: OJ
	Checked: JA	Page: 8 of 11		Date: October 2021
PROJECT: Community Tapstand Project in Bugiri & Namayingo Districts	Scale: NTS	Title: Storey Beams & Structural Details		

GENERAL NOTES:
1. Unless otherwise stated dimensions are in millimetres (mm)
2. Do not scale off drawings
3. All levels and dimensions to be checked on site before cutting or bending of steel
4. All reinforced concrete is in accordance with structural engineer's details



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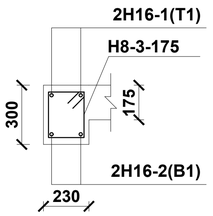

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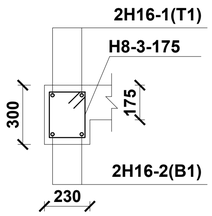

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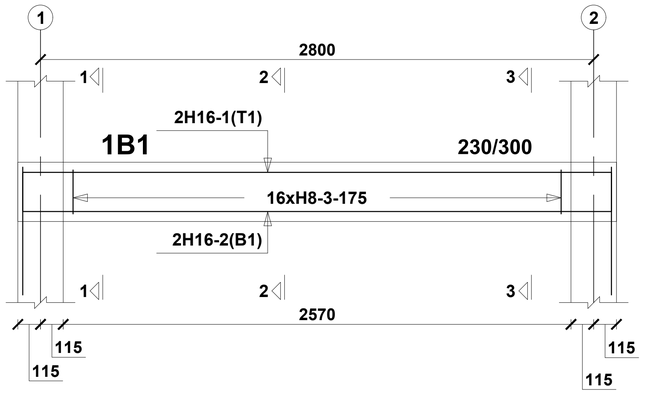

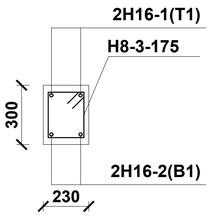

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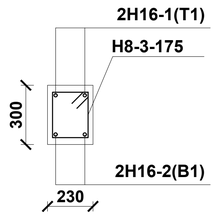

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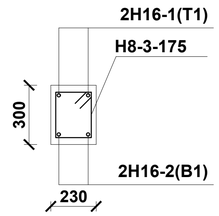

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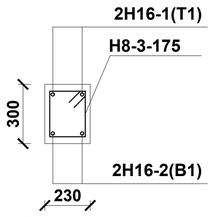

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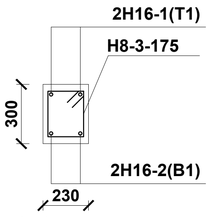

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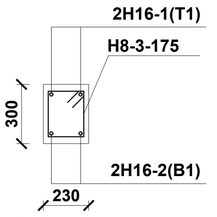

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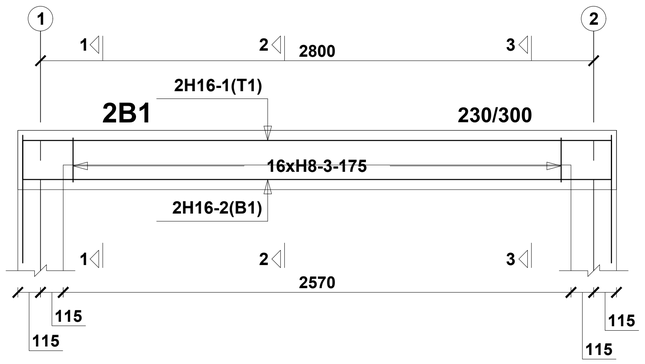

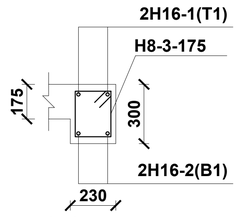

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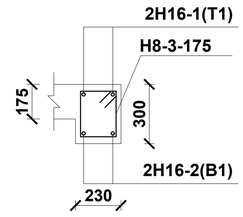

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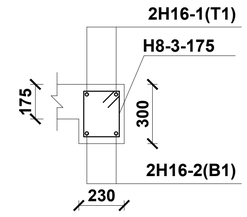

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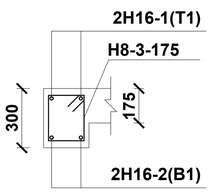

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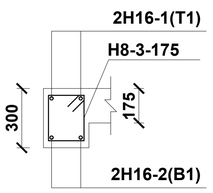

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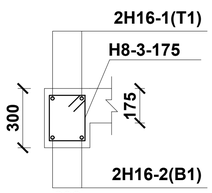

(A) 3 - 3

STEEL BAR QUANTITY TABLE									
DIA (mm)		H8	H16						
UNIT WEIGHT (kg/m)		0.3946	1.5783						
TOTAL LEN (m)		128.0	123.2						
TOTAL WEIGHT (kg)		50.5	194.5						
GRAND TOTAL (kg)		245.0							
POS	QTY	DIAM (mm)	LENGTH (mm)	TOTAL (m)	POS	QTY	DIAM (mm)	LENGTH (mm)	TOTAL (m)
1	16	H16	4250	68	3	128	H8	1000	128
2	16	H16	3450	55.2					

STOREY BEAMS & R C.STRUCTURAL DETAILS

GOAL

Designed & Drawn: OJ	Date: November 2020	Drawing No: 6	Revised: OJ
Checked: JA	Page: 9 of 11		Date: October 2021
PROJECT: Community Tapstand Project in Bugiri & Namayingo Districts	Scale: NTS	Title: Storey Beams & Structural Details_1	

GENERAL NOTES:
1. Unless otherwise stated dimensions are in millimetres (mm)
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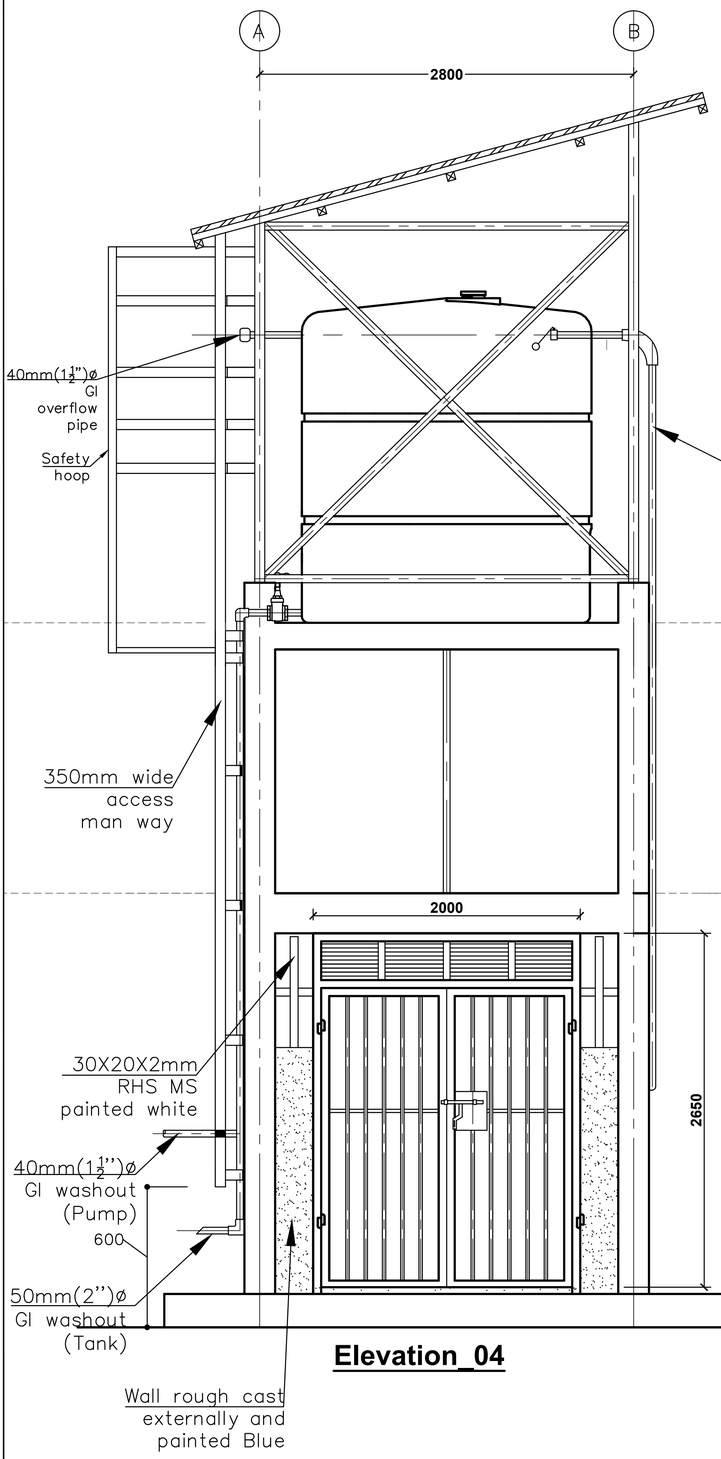
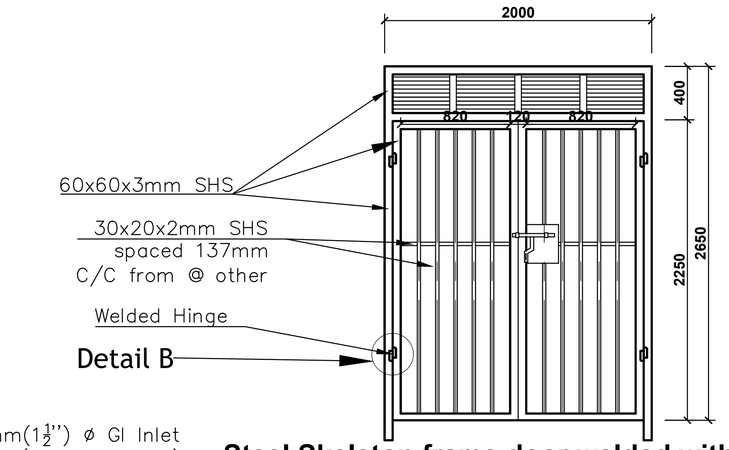
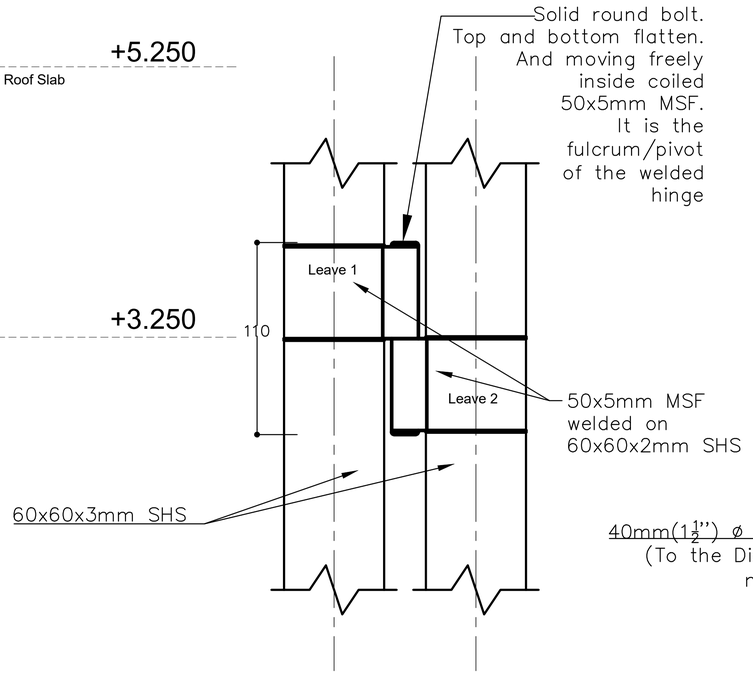
3. All levels and dimensions to be checked on site before cutting or bending of steel
4. All reinforced concrete is in accordance with structural engineer's details



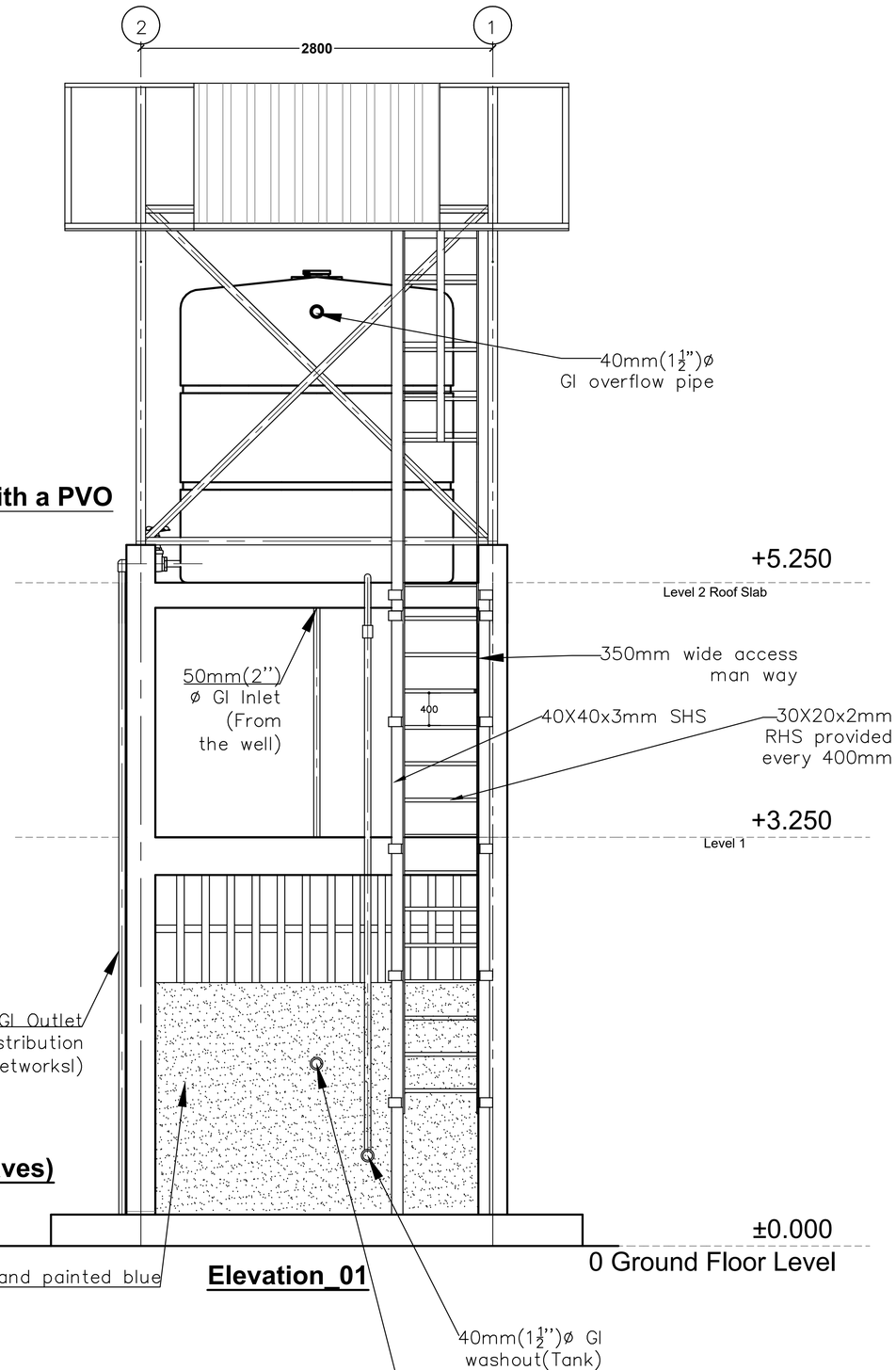
Elevation_04



Steel Skeleton frame door welded with 25x20x2mm SHS to 60x60x2mm frame with a PVO



Detail B (Wielded Hinge, Two Leaves)

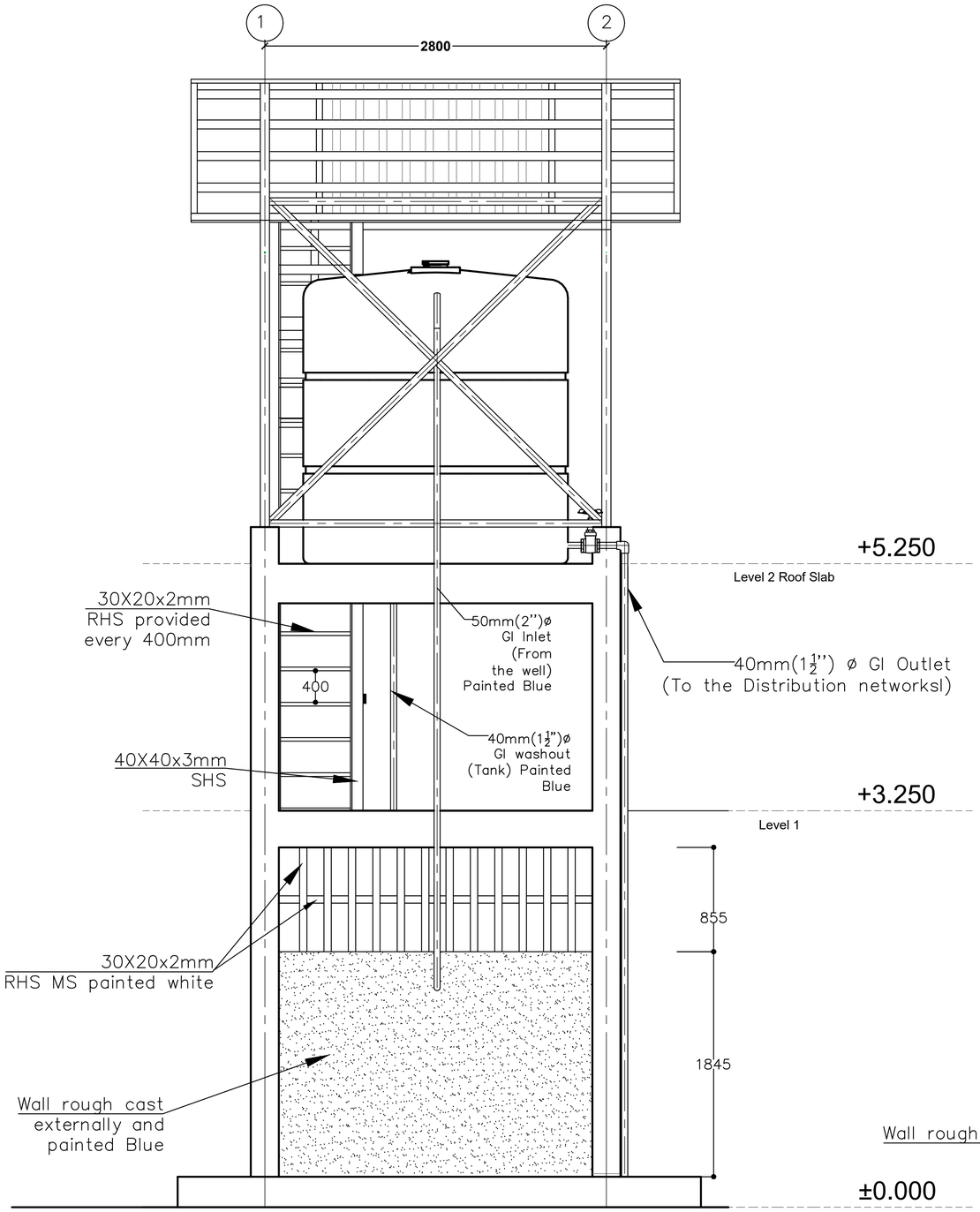


Elevation_01

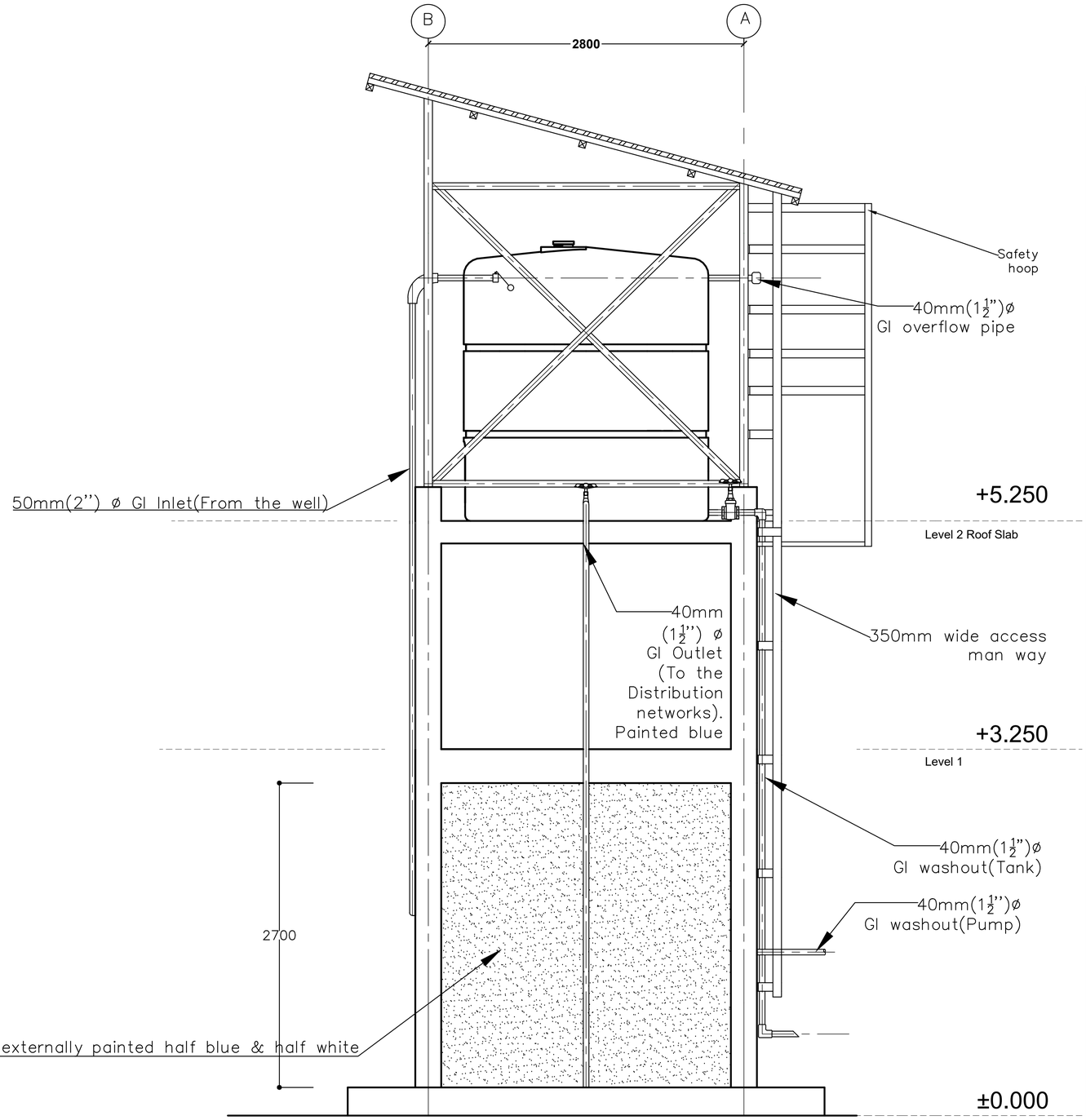
GOAL

	Designed & Drawn: OJ	Date: November 2020	Drawing No: 6	Revised: OJ
	Checked: JA	Page: 10 of 11		Date: October 2021
PROJECT: Community Tapstand Project in Bugiri & Namayingo Districts	Scale: NTS	Title: Tank Elevations(04 & 01)		

GENERAL NOTES:
1. Unless otherwise stated dimensions are in millimetres (mm)
2. Do not scale off drawings
3. All levels and dimensions to be checked on site before cutting or bending of steel



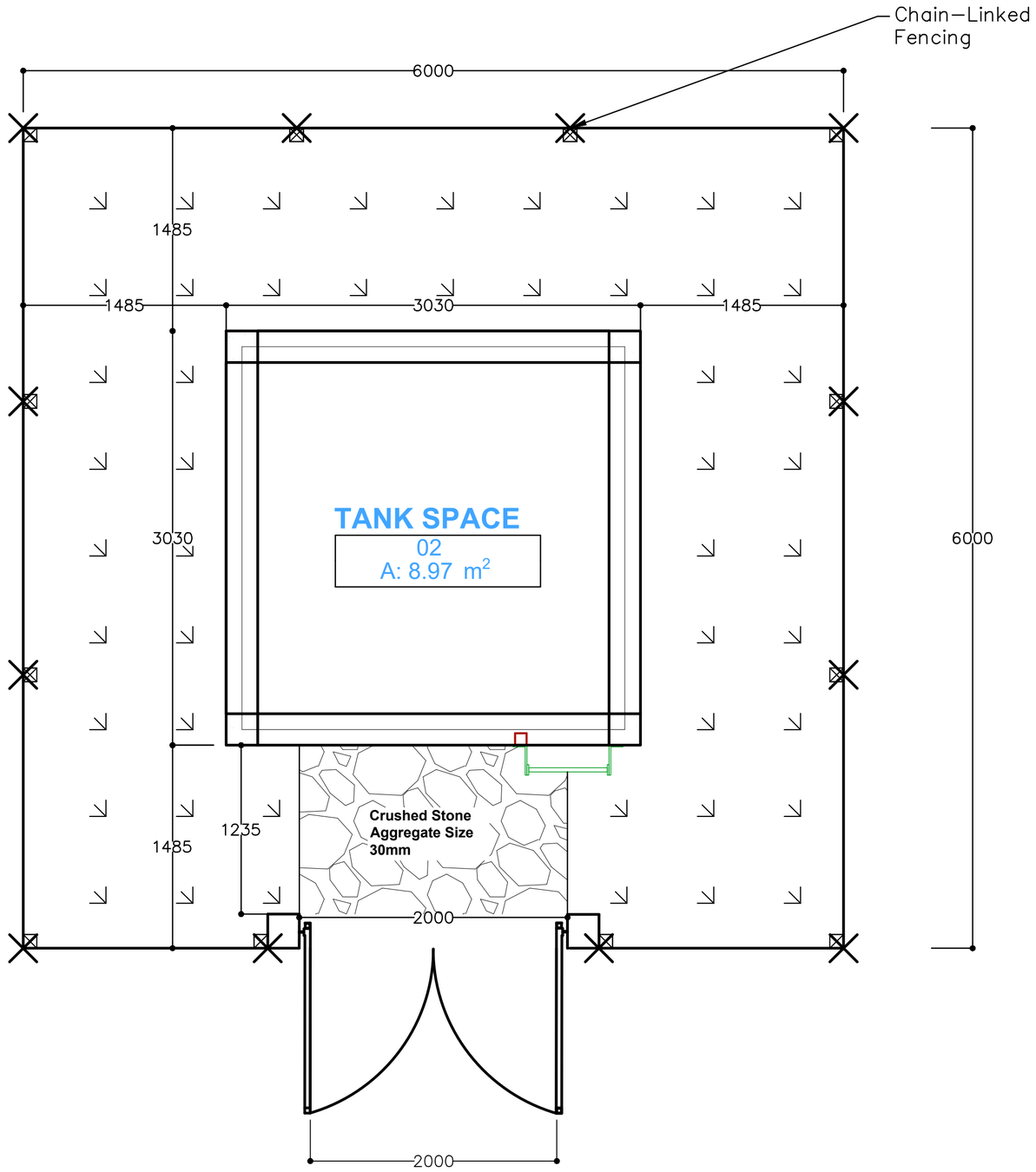
Elevation_03



Elevation_02

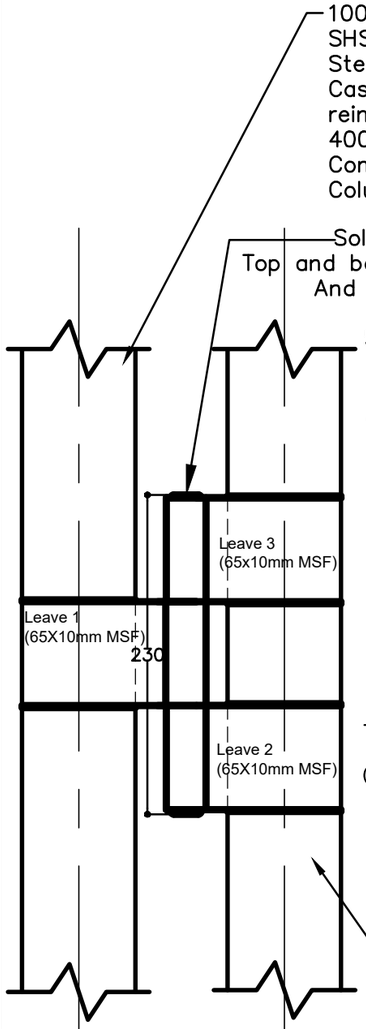
GOAL	Designed & Drawn: OJ	Date: November 2020	Drawing No: 6	Revised: OJ
	Checked: JA	Page: 11 of 11		Date: October 2021
PROJECT: Community Tapstand Project in Bugiri & Namayingo Districts	Scale: NTS	Title: Tank Elevations(03 & 02)		

GENERAL NOTES:
1. Unless otherwise stated dimensions are in millimetres (mm)
2. Do not scale off drawings
3. All levels and dimensions to be checked on site before cutting or bending of steel

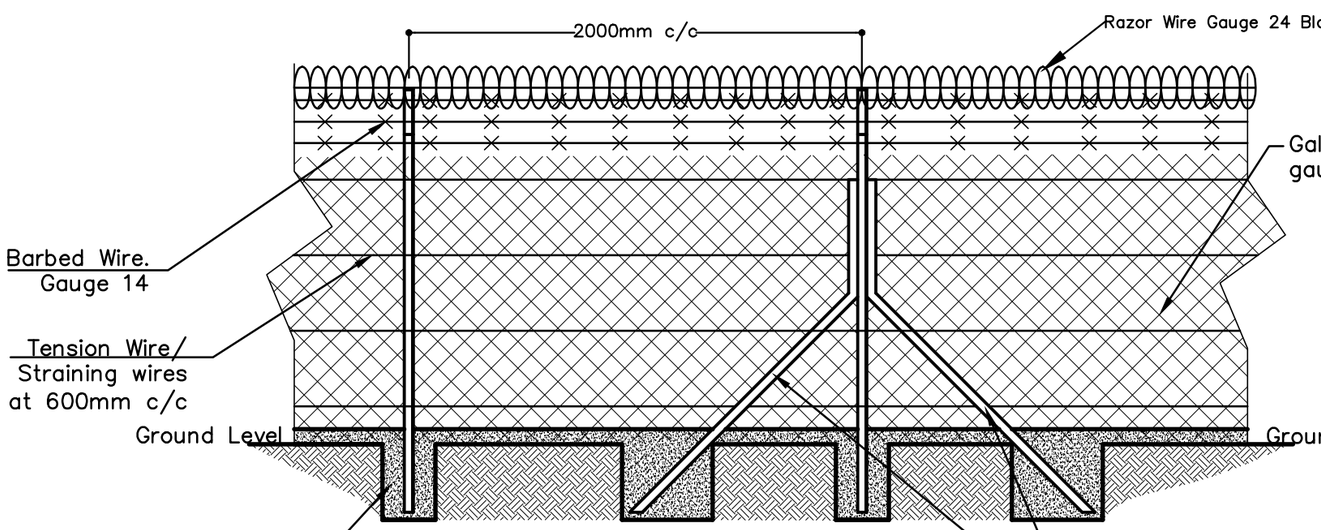


Site Lay-Out Plan

GOAL	Designed & Dawn: OJ	Date: November 2020	Drawing No: 7	Revised: OJ	GENERAL NOTES: 1. Unless otherwise stated dimensions are in millimetres (mm) 2. Do not scale off drawings 3. All levels and dimensions to be checked on site before cutting or bending of steel
	Checked: JA	Page: 1 of 2		Date: October 2021	
PROJECT: Community Tapstand Project in Bugiri & Namayingo Districts	Scale: NTS	Title: Layout Plan for the Intake Area			

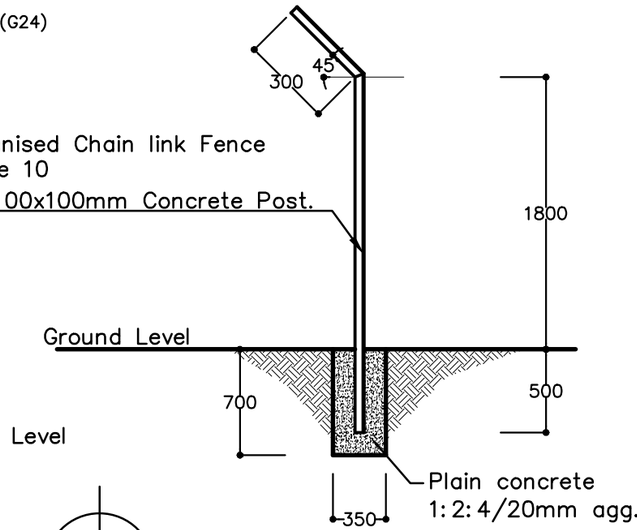


Detail A (Wielded Hinge, Three Leaves)

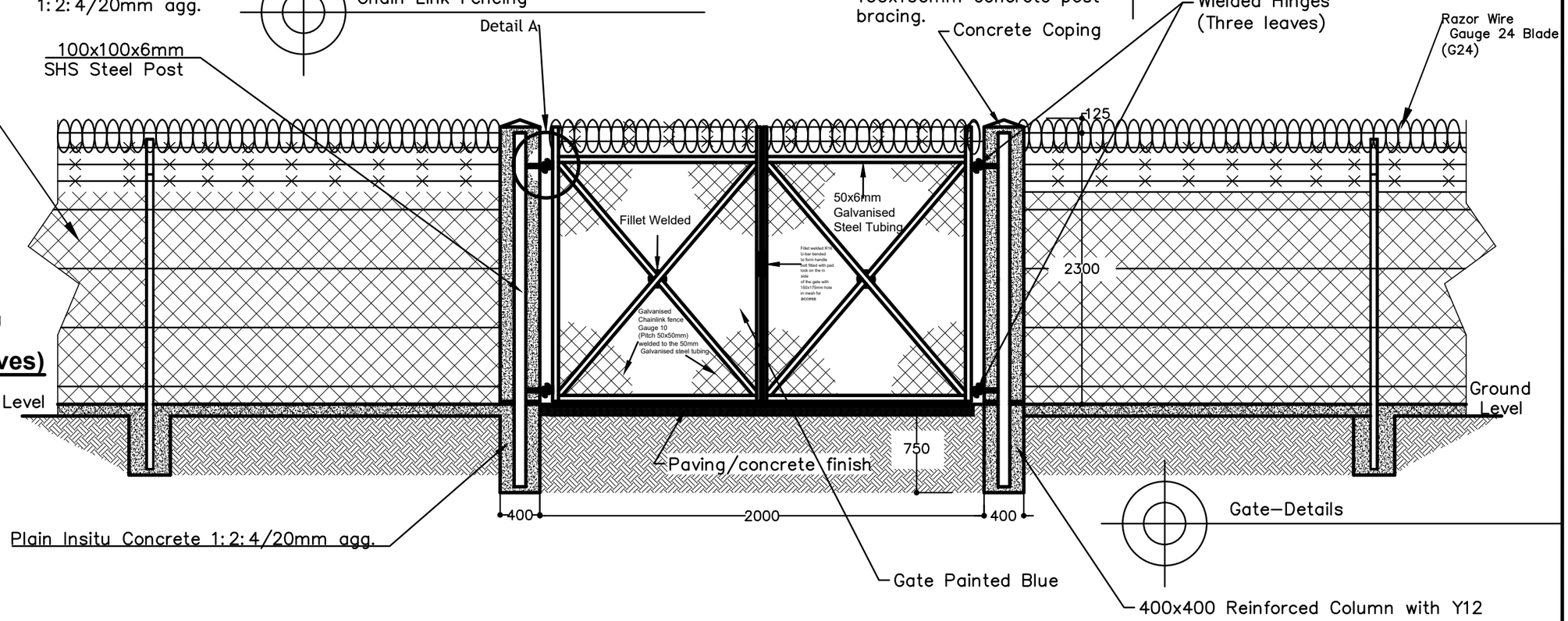


Chain Link Fencing

Detail A



Fencing Post Details



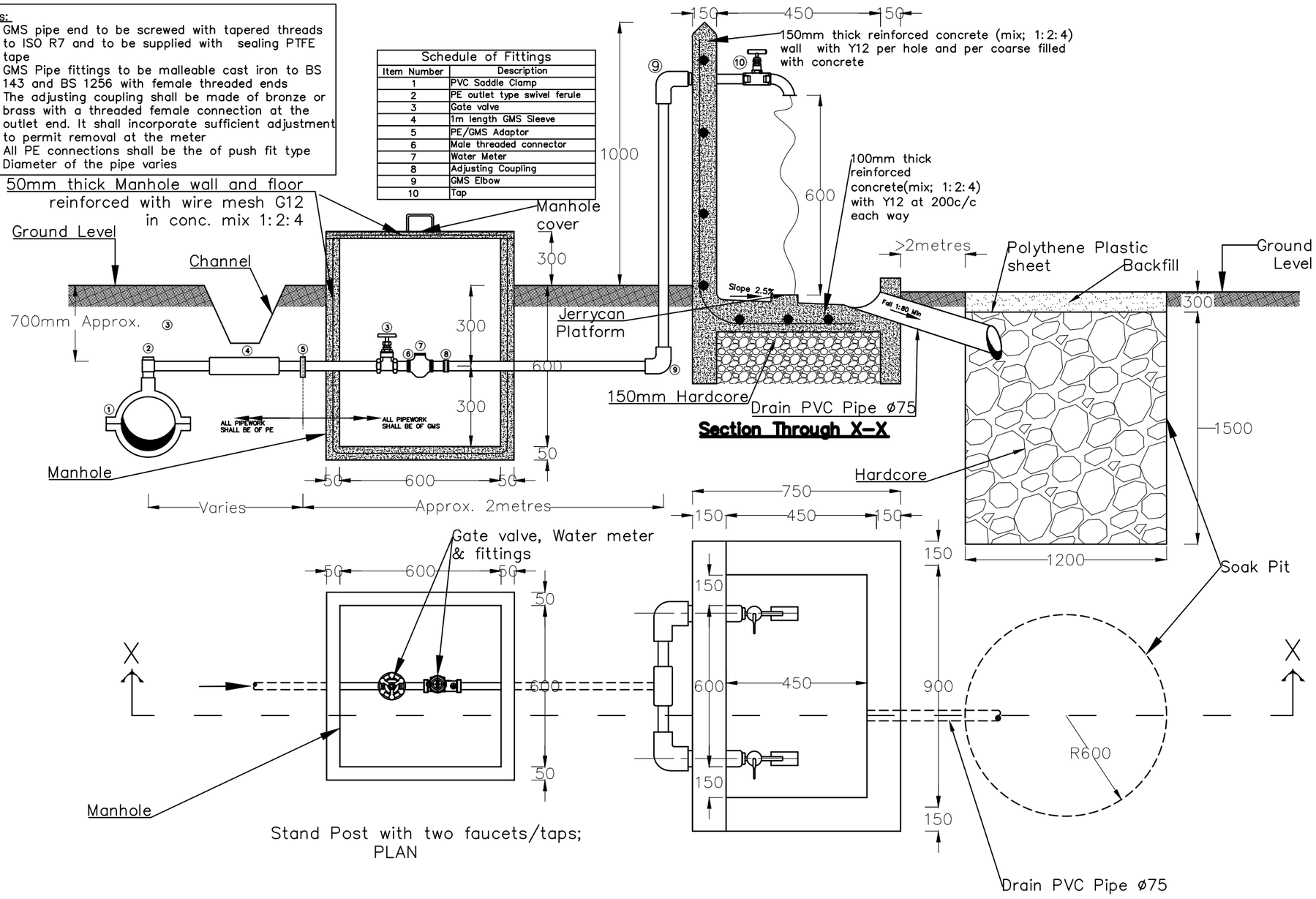
Gate–Details

GOAL	Designed & Drawn: OJ	Date: November 2020	Drawing No: 7	Revised: OJ	GENERAL NOTES: 1. Unless otherwise stated dimensions are in millimetres (mm) 2. Do not scale off drawings 3. All levels and dimensions to be checked on site 4 Depth of foundation to be determined on site
	Checked: JA	Page: 2 of 2		Date: October 2021	
PROJECT: Community Tapstand Project in Bugiri & Namayingo Districts	Scale: Not to scale	Title: Fencing Details for Intake			

Notes:

1. GMS pipe end to be screwed with tapered threads to ISO R7 and to be supplied with sealing PTFE tape
2. GMS Pipe fittings to be malleable cast iron to BS 143 and BS 1256 with female threaded ends
3. The adjusting coupling shall be made of bronze or brass with a threaded female connection at the outlet end. It shall incorporate sufficient adjustment to permit removal at the meter
4. All PE connections shall be the of push fit type
5. Diameter of the pipe varies

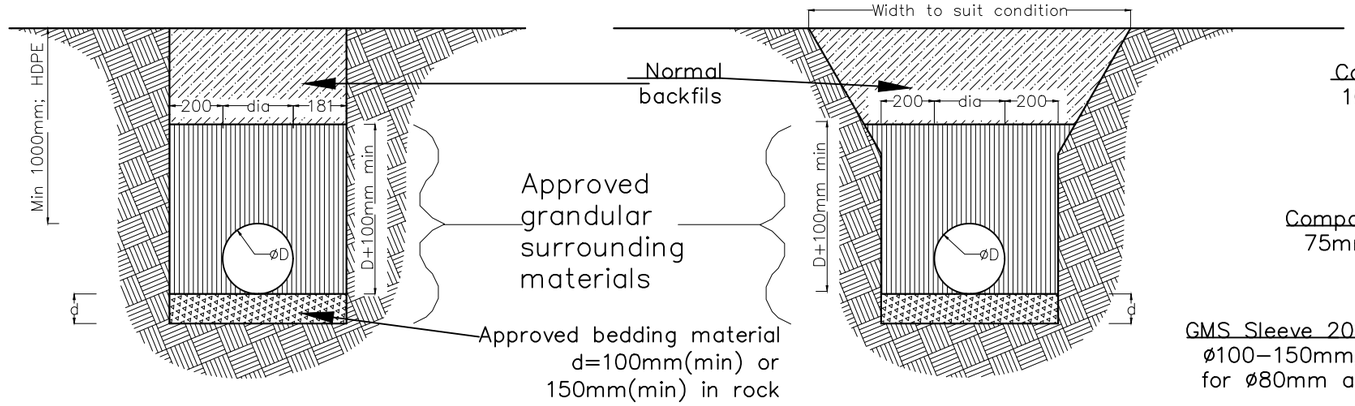
Schedule of Fittings	
Item Number	Description
1	PVC Saddle Clamp
2	PE outlet type swivel ferule
3	Gate valve
4	1m length GMS Sleeve
5	PE/GMS Adaptor
6	Male threaded connector
7	Water Meter
8	Adjusting Coupling
9	GMS Elbow
10	Tap



Section Through X–X

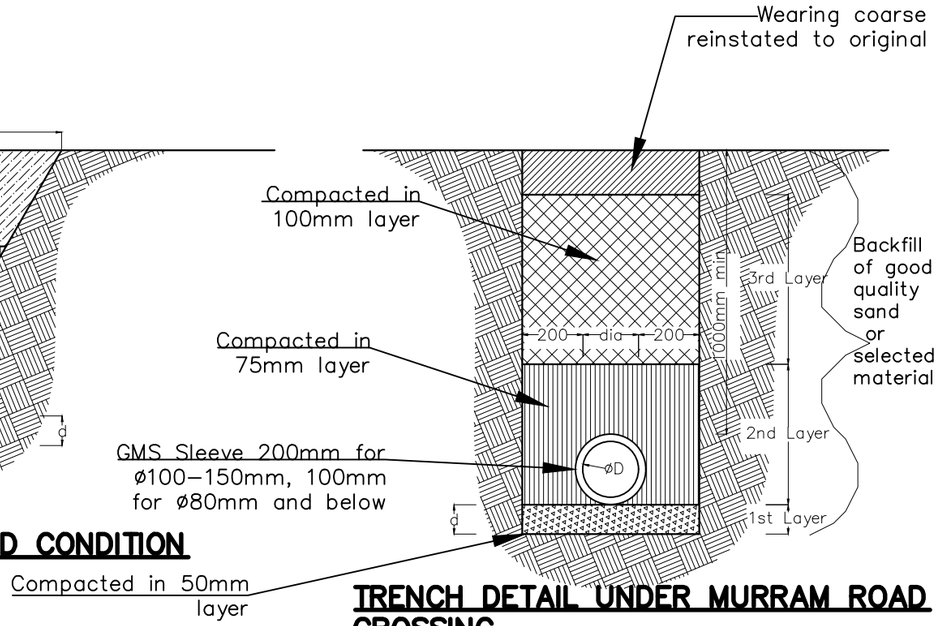
Stand Post with two faucets/taps; PLAN

GOAL	Designed & Drawn: OJ	Date: November 2020	Drawing No: 8	Revised: OJ	GENERAL NOTES: 1. Unless otherwise stated dimensions are in millimetres (mm) 2. Do not scale off drawings 3. All levels and dimensions to be checked on site 4. Depth of foundation to be determined on site 5. All sanitary works to be the approved standards of public health department 6. All roads, storm water and drainage to civil engineer's details
	Checked: JA	Page: 1 of 1		Date: October, 2021	
PROJECT: Community Tapstand Project in Bugiri & Namayingo Districts	Scale: NTS	Title: Public Tapstand			

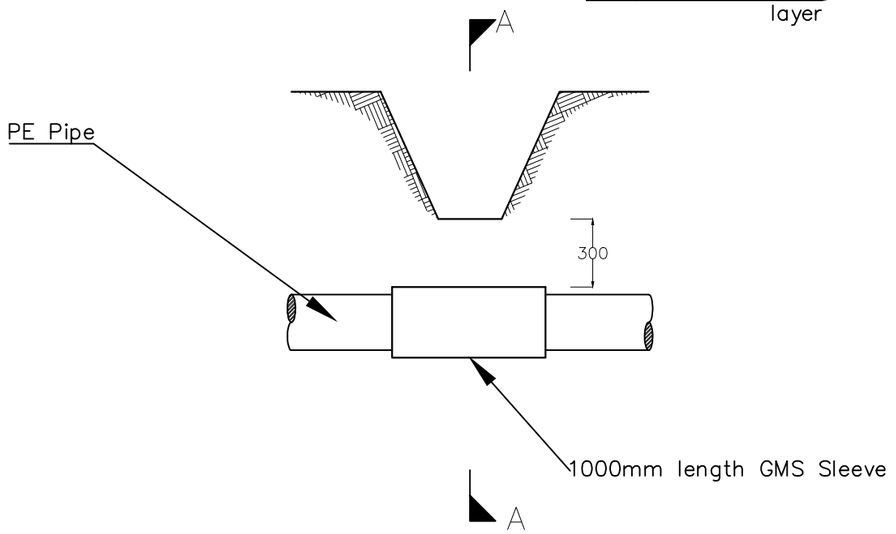


TRENCH STABLE GROUND CONDITION

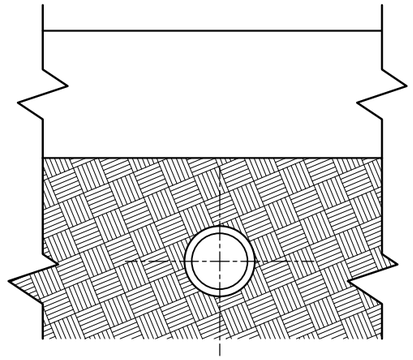
TRENCH UNSTABLE GROUND CONDITION



TRENCH DETAIL UNDER MURRAM ROAD CROSSING

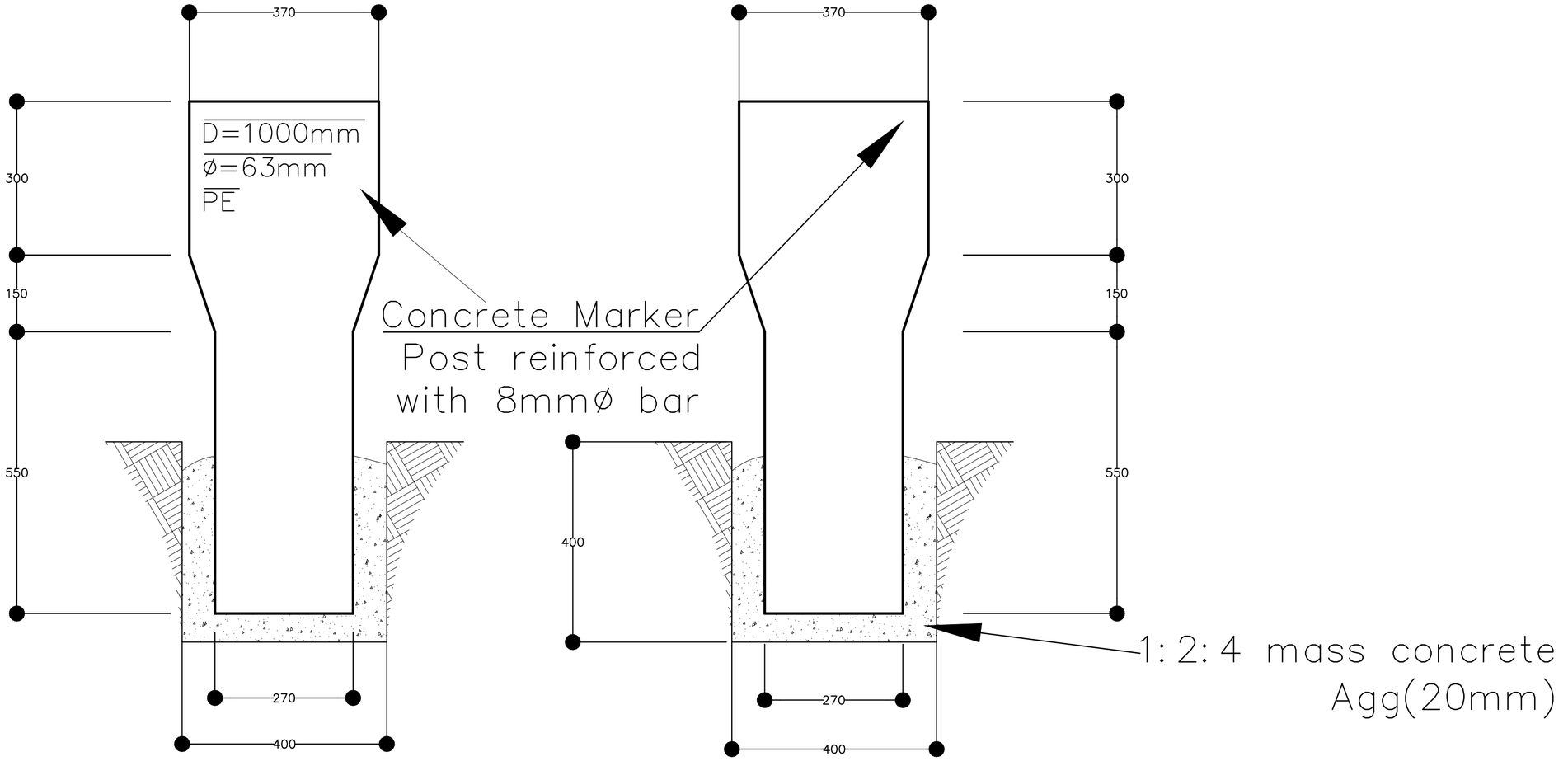


DITCH/ CHANNEL CROSSING



SECTION THROUGH A–A

GOAL	Designed & Drawn: OJ	Date: November, 2020	Drawing No: 9	Revised: OJ	GENERAL NOTES: 1. Unless otherwise stated dimensions are in millimetres (mm) 2. Do not scale off drawings 3. All levels and dimensions to be checked on site 4. Depth of foundation to be determined on site 5. All roads, storm water and drainage to civil engineer's details
	Checked: JA	Page: 1 of 1		Date: October 2021	
PROJECT: Community Tapstand Project in Bugiri & Namayingo Districts	Scale: NTS	Title: Trenching Details			



FRONT VIEW

BACK VIEW

MARKER POST ELEVATION

GOAL	Designed: OJ	Date: November 2020	Drawing No: 10	Revised: OJ
	Drawn: OJ			Date: October 2021
	Checked: JA	Page: 1 of 1		
PROJECT: Community Tapstand Project in Bugiri & Namayingo Districts	Scale: NTS	Title: Marker Post Details Systematic Drawings		

GENERAL NOTES:

1. Unless otherwise stated dimensions are in millimetres (mm)
2. Do not scale off drawings
3. All levels and dimensions to be checked on site before cutting or bending of steel
4. Foundation depth to be determine on site

GOAL Uganda
Plot 5448, Block 244, Bonge Way
Kansanga, Kampala (U):
P.O BOX 33140,Kampala (U)
http://www.goalglobal.org/countries

Tuesday, October 12, 2021

Nakabale CTS

Solar pumping project

Parameter

Location:	Uganda, Jinja (0°; 33° East)	Water temperature:	25 °C		
Required daily output:	29 m³; Sizing for average month	Dirt loss:	5.0 %	Motor cable:	65 m
Pipe type:	steel, weldless, new neatly galvanized: 0.100 mm	Static head:	39 m	Pipe length:	51 m

Products

	Quantity	Details
PS2-1800 HRE-23-2	1 pc.	Submersible pump system including controller with DataModule, motor and pump end
LC330-P72	4 pc.	1,320 Wp; 4 x 1 modules; 15 ° tilted
Motor cable	65 m	6 mm² 3-phase cable for power and 1-phase cable for ground
Pipeline	51 m	50 mm (inner diameter) Pipeline
CONNECTED products	1 set	PS Communicator 3G
Accessories	1 set	Well Probe V2, Liquid Level Sensor, Liquid Pressure Sensor, Water Meter, PV Disconnect 440-40-1, PV Disconnect 440-40-3, Surge Protector2

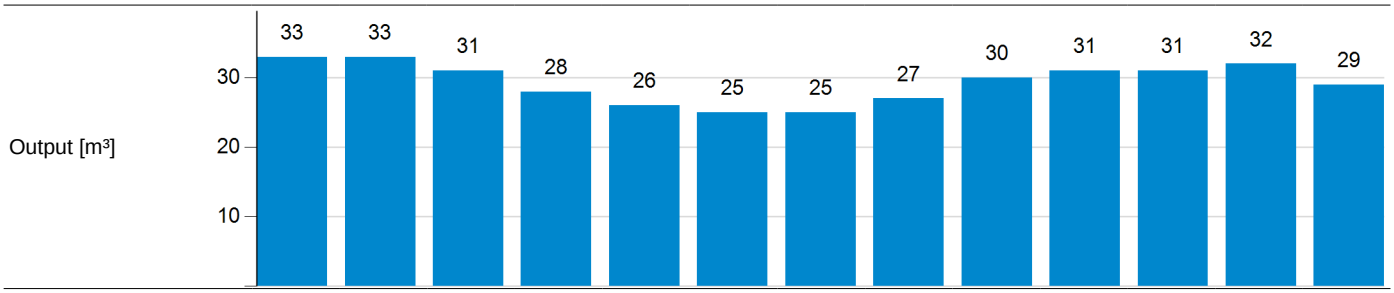
Sun Sensor setting in PumpScanner

min. 100 W/m²

Daily output in average month

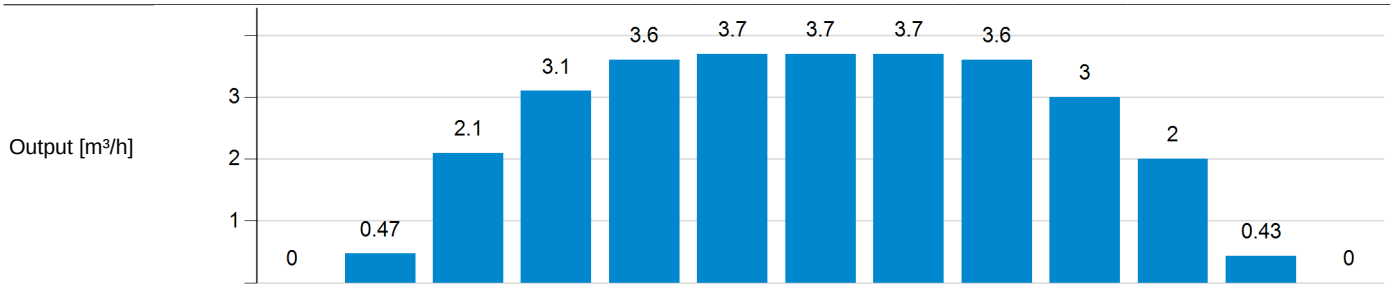
29 m³

Daily values



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Av.
Energy [kWh]	7.3	7.3	6.8	6.0	5.4	5.1	5.1	5.6	6.3	6.4	6.6	7.1	6.2
Irradiation [kWh/m²]	6.3	6.4	5.9	5.2	4.6	4.4	4.4	4.8	5.5	5.6	5.7	6.1	5.4
Rainfall [mm]	2.0	2.5	4.4	6.7	5.5	2.9	2.4	3.2	3.7	4.6	5.1	3.1	3.8
Ambient temp. [°C]	22	23	23	22	21	21	21	21	21	21	21	22	22

Hourly values



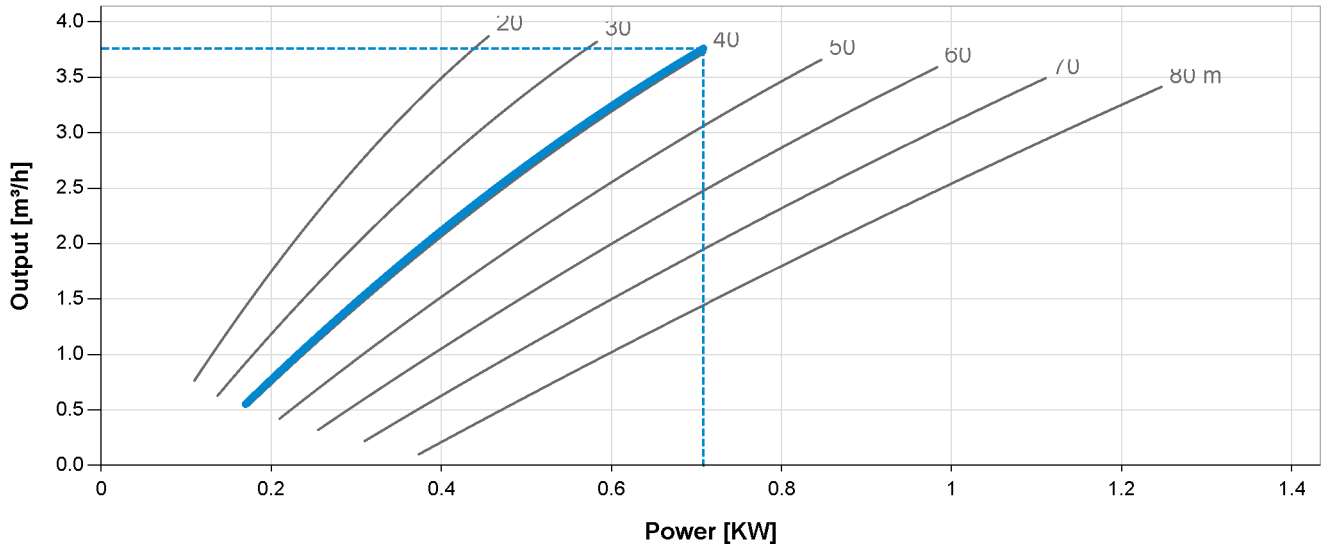
	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00
Energy [kWh]	0	0.19	0.41	0.60	0.73	0.81	0.83	0.80	0.72	0.58	0.39	0.18	0
Irradiation [kWh/m²]	0	0.15	0.33	0.50	0.63	0.71	0.74	0.71	0.63	0.50	0.33	0.15	0
Ambient temp. [°C]	17	17	18	20	22	24	26	27	27	27	27	26	26

Tuesday, October 12, 2021

Nakabale CTS

Solar pumping project

System characteristic



			Min.	800 W/m², 20 °C	Max./STC*
PV generator	Cell temperature	[°C]		46	25
	Temperature loss	[%]		9.0	-
	Dirt loss	[%]		5.0	-
	Pmax	[Wp]		913	1,320
	Vmp	[V]		136	149
	Imp	[A]		6.7	9
	Voc	[V]		167	182
	Isc	[A]		7.3	10
	Pout	[W]		732	-
	Vout	[V]		153	-
	Iout	[A]		4.9	-
Motor cable	Power loss	[%]	2.0	2.0	5.4
Pump systems	Motor power	[W]	170	708	708
	Motor voltage	[V EC]	34	115	115
	Motor current	[A]	5.0	6.2	6.2
	Motor speed	[rpm]	937	3,300	3,300
	Flow rate	[m³/h]	0.56	3.8	3.8
	Efficiency	[%]	33	56	57
Pipeline	Flow speed	[m/s]	0.079	0.53	0.53
	Friction loss	[m]	0.012	0.36	0.36

*STC: Standard test conditions for photovoltaic modules, 1000 W/m² solar irradiance, 25 °C cell temperature

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Kansanga, Kampala (U):
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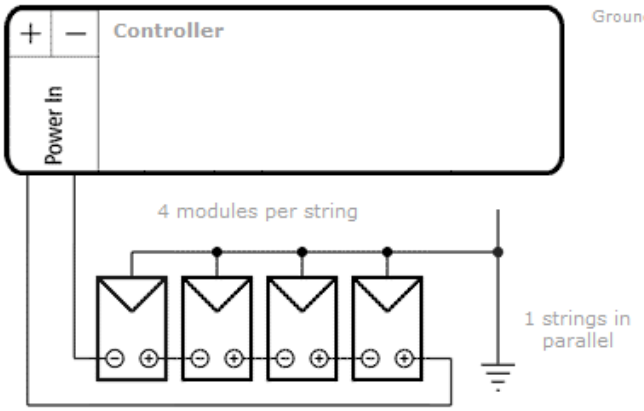
http://www.goalglobal.org/countries

Tuesday, October 12, 2021

Nakabale CTS

Solar pumping project

Wiring diagram



Grounding should be done according to the instructions of the module manufacturer.

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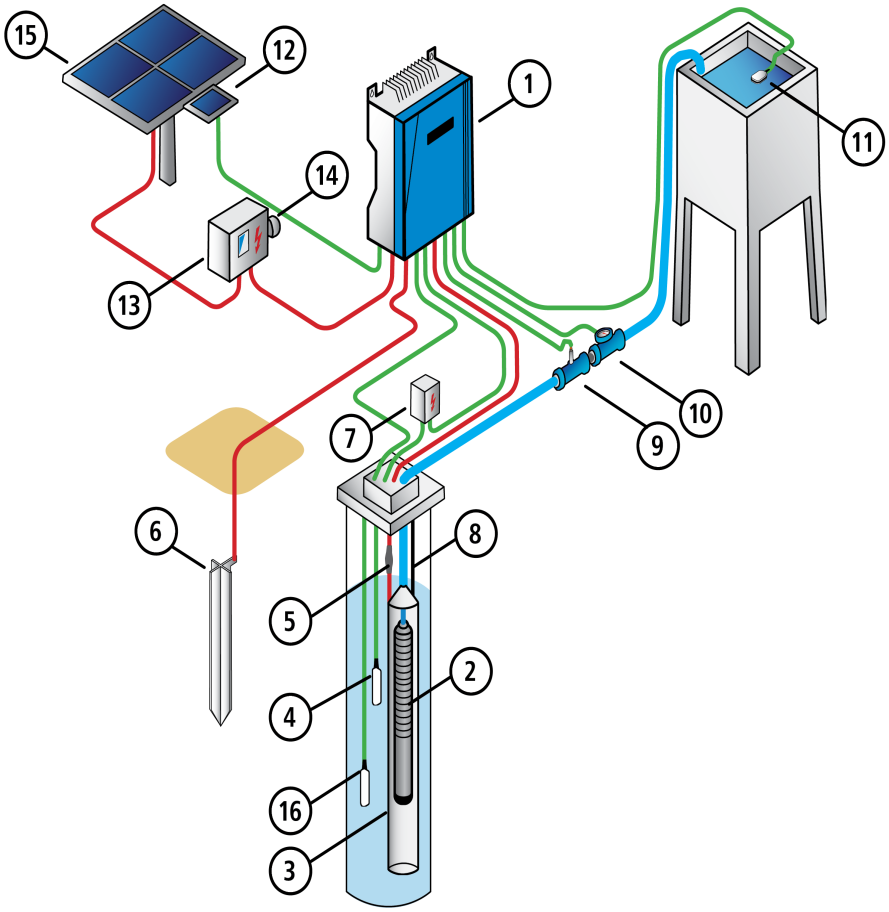
Solar pumping project

System Layout



1: PS2 Controller	**11:** Float Switch
2: Submersible Pump	**12:** Sun Switch
3: Flow Sleeve	**13:** PV Disconnect
4: Well Probe	**14:** Lightning Surge Protector
5: Cable Splice Kit	**15:** PV Generator
6: Grounding Rod	
7: Surge Protector*	
8: Safety Rope	
9: Water Meter	
10: Pressure Sensor	

*It is recommended to install a Surge Protector at each controller sensor input.

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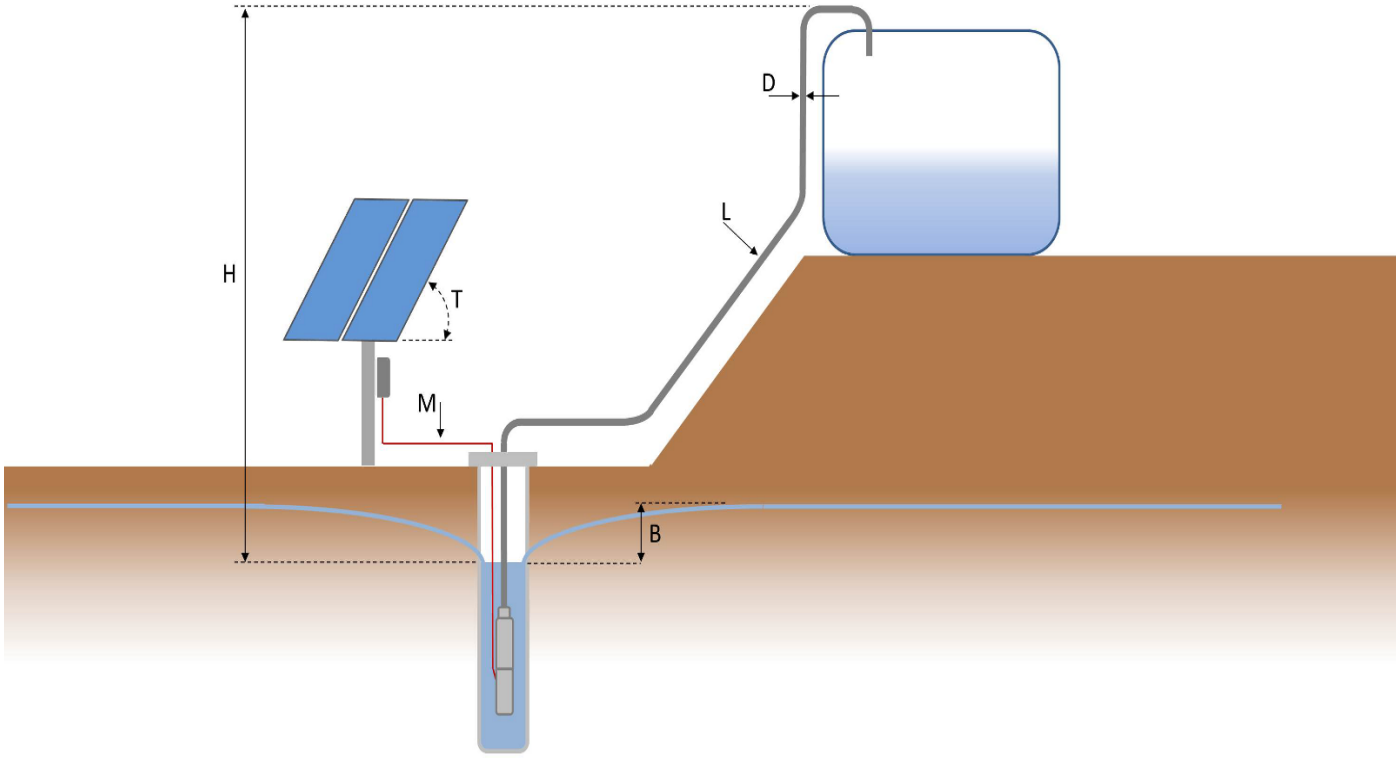
Nakabale CTS

Solar pumping project

Sizing Layout



H (Static head):	Vertical height from the dynamic water level to the highest point of delivery.
B (Drawdown):	Lowering of water level depending on flow rate and recovery rate of the well.
D (Pipeline inner diameter)	
L (Pipe length):	Entire pipeline from the pump outlet to the point of delivery. Ellbows and armatures must be added as an equivalent length of pipeline.
M (Motor cable):	The cable between controller and pump unit.
T (Tilt angle):	Angle of the PV generator surface from the horizontal plane.

PS2-1800 HRE-23

Solar Submersible Pump System for 4" wells

System Overview

Head	max. 80 m
Flow rate	max. 3.9 m³/h

Technical Data

Controller PS2-1800

- Controlling and monitoring
- Control inputs for dry running protection, remote control etc.
- Protected against reverse polarity, overload and overtemperature
- Integrated MPPT (Maximum Power Point Tracking)
- Battery operation: Integrated low voltage disconnect
- Integrated Sun Sensor

Power	max. 1.8 kW
Input voltage	max. 200 V
Optimum Vmp**	> 102 V
Motor current	max. 14 A
Efficiency	max. 98 %
Ambient temp.	-40...50 °C
Enclosure class	IP68

Motor ECDRIVE 1800-HRE

- Maintenance-free brushless DC motor
- Water filled
- Premium materials, stainless steel: AISI 304/316
- No electronics in the motor

Rated power	1.7 kW
Efficiency	max. 92 %
Motor speed	900...3,300 rpm
Insulation class	F
Enclosure class	IP68
Submersion	max. 150 m

Pump End PE HRE-23***

- Non-return valve
- Premium materials, stainless steel: AISI 304/316
- Helical rotor pump

Efficiency	max. 67 %

Pump Unit PU1800 HRE-23 (Motor, Pump End)

Borehole diameter	min. 4,0 in
Water temperature	max. 50 °C

Standards

CE 2006/42/EC, 2004/108/EC, 2006/95/EC

IEC/EN 61702:1995, IEC/EN 62253 Ed.1

The logos shown reflect the approvals that have been granted for this product family. Products are ordered and supplied with the approvals specific to the market requirements.

**Vmp: MPP-voltage under Standard Test Conditions (STC): 1000 W/m² solar irradiance, 25 °C cell temperature

***Specify temperature range on order

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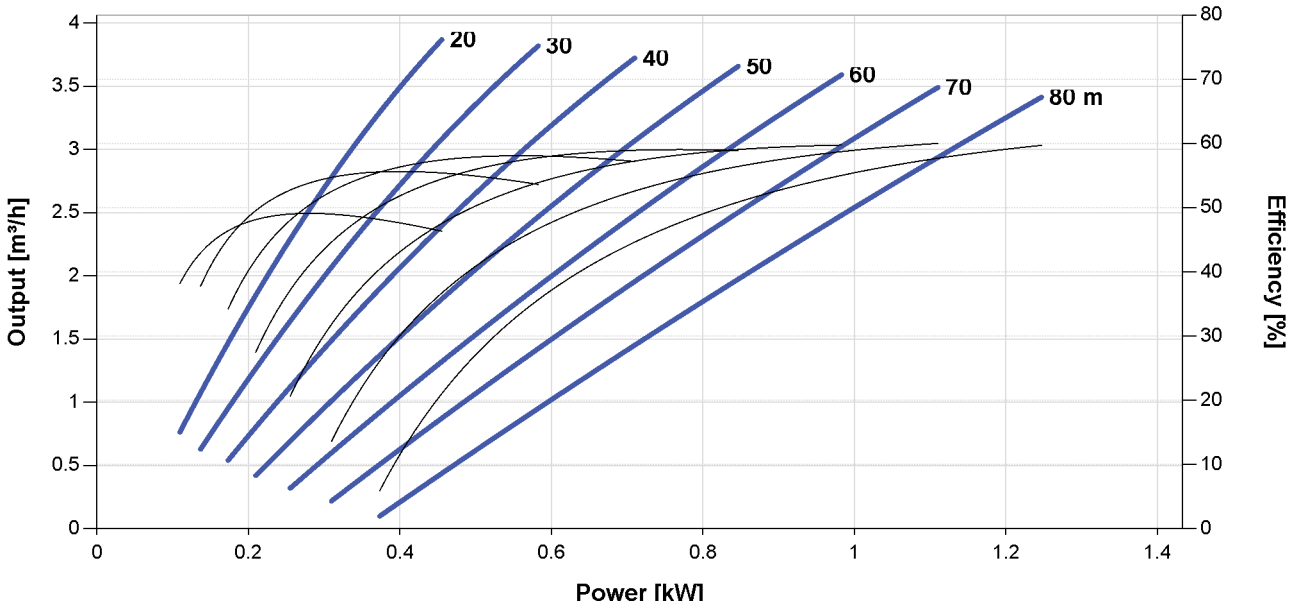
PS2-1800 HRE-23

Solar Submersible Pump System for 4" wells

Pump Chart

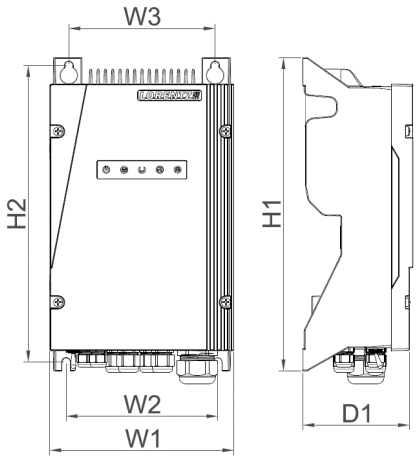
Vmp* > 102 V



Dimensions and Weights

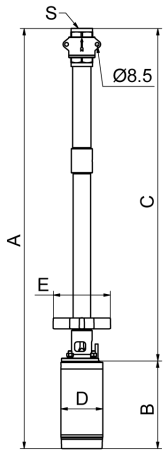
Controller

H1 = 352 mm
H2 = 333 mm
W1 = 207 mm
W2 = 170 mm
W3 = 164 mm
D1 = 124 mm



Pump Unit

A = 970 mm
B = 205 mm
C = 765 mm
D = 96 mm
E = 147 mm
S = 1.25 in



	Net weight
Controller	6.0 kg
Pump Unit	11 kg
Motor	6.8 kg
Pump End	4.5 kg

*Vmp: MPP-voltage under Standard Test Conditions (STC): 1000 W/m² solar irradiance, 25 °C cell temperature

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Well Probe V2

Mechanical float switch for dry run protection of LORENTZ solar pumps

The well probe provides a reliable method of run dry protection for LORENTZ pumps. The well probe detects that water is present within a well, tank or other water source. The well probe is typically attached to the riser pipe above the pump and connected to the controller. When the well probe becomes dry (water level is below the probe) the pump switches off to avoid dry running.

Order Information

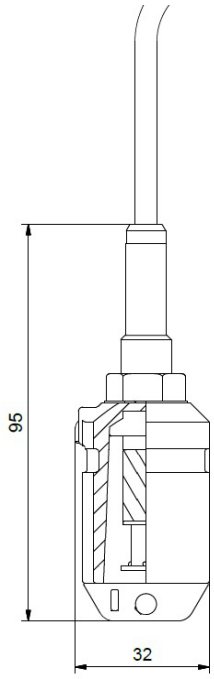
Item no.: 19-000005 **Product name:** Well probe sensor V2

Features

- Reliable dry run protection
- Simple to install using 3 cable ties
- Improved tolerance to dirt
- Splicing kit and cable ties for fixing are included

Technical Data

- Max. operating temperature 55°C
- Enclosure class: IP68
- Submersion depth: max 50 m (164 ft)
- Cable length: 1.5 m
- Wire size: 2 x 0.50 mm² or AWG 20, waterproofed
- Must be mounted in a vertical position
- Meets the requirements for CE



Dimensions / Weight

- Packaging dimensions: 255 x 170 x 40 mm
  10.0 x 6.7 x 1.6 in
- Total weight: 0.1 kg / 0.2 lbs

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V181107

WP Water Meter

The WP (Woltman) Water Meter is suitable for applications with a pipe size from DN50 to DN200.

Features

- Dry dial register ensures clear reading
- Low pressure loss, long working life
- Easy to install
- Reed switch output for easy water flow control and monitoring

Technical Data

- Water temperature 40°C
- Water pressure: max. 16 bar
- IP64
- CE Conformity

CE

Order information

item number	description
19-002165	water meter, WP-DN50, 0.1 cbm/p
19-002170	water meter, WP-DN65, 0.1 cbm/p
19-002180	water meter, WP-DN80, 0.1 cbm/p
19-002190	water meter, WP-DN100, 0.1 cbm/p
19-002200	water meter, WP-DN125, 0.1 cbm/p
19-002210	water meter, WP-DN150, 0.1 cbm/p
19-002202	water meter, WP-DN200, 0.1 cbm/p

Accuracy Curve

The Accuracy curve shows the deviation in percent for different flow rates. In regular operation the deviation is between -2% and +2%.

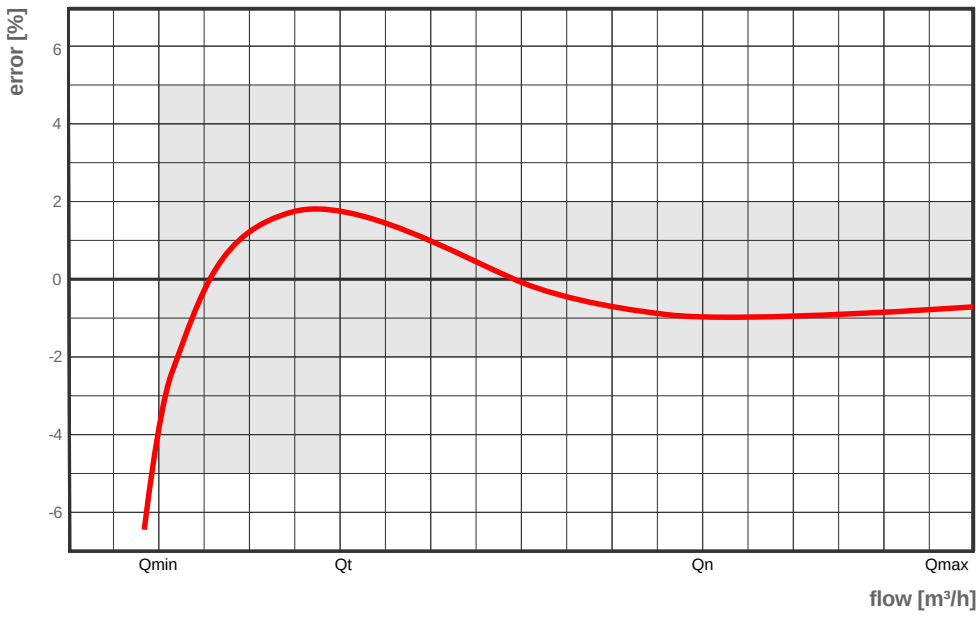
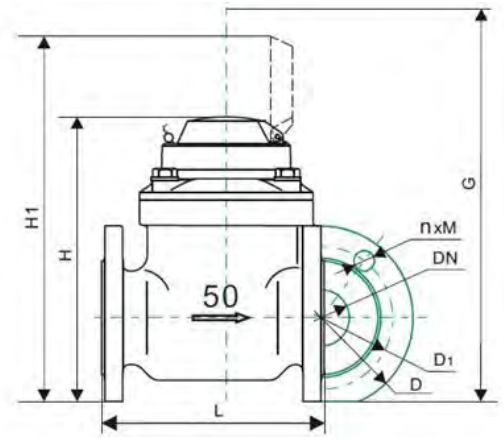


Table 1: WP - Flow rate characterisitics

	DN50	DN65	DN80	DN100	DN125	DN150	DN200
max. flow rate: Q_{max} [m³/h]	30	50	80	120	200	300	500
nominal flow rate: Q_n [m³/h]	15	25	40	60	100	150	250
transition flow rate: Q_t [m³/h]	3.0	5.0	8.0	12	20	30	50
minimum flow rate: Q_{min} [m³/h]	0.7	0.75	1.2	1.8	3.0	4.5	7.5

Table 2: WP - Dimensions, weight specifications

	DN50	DN65	DN80	DN100	DN125	DN150	DN200
L [mm]	200	200	225	250	250	300	350
H [mm]	232	242	252	262	275	325	355
H1 [mm]	303	313	323	333	346	396	426
G [mm]	360	360	360	360	360	420	420
D [mm]	165	185	200	220	250	285	340
D [mm]	125	145	160	180	210	240	295
Connecting bolt quantity	4xM16	4xM16	8xM16	8xM16	8xM16	8xM20	12xM20
Weight [kg]	12	13	16	18	20	42	74



About LORENTZ

LORENTZ is the global market leader in solar powered water pumping solutions. Founded in Germany during 1993 LORENTZ has pioneered, innovated and excelled in the engineering and manufacturing of solar powered water pumping. Today LORENTZ is active in over 130 countries through a dedicated network of professional partners. LORENTZ technology uses the power of the sun to pump water, sustaining and enhancing the life of millions of people, their livestock and crops.

Simply – ***Sun. Water. Life.***

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v210602

PV Disconnect 440-40-1

Connection box with DC disconnect

Description

An outdoor rated, combining connection box with DC disconnect switch that allows 1 strings of PV modules to be connected safely to a solar pump system.

The PV disconnect is also designed to accept an optional lightning protection device.

photo may differ from actual product

Features

- DC rated disconnect to provide safe isolation of the system
- Robust weather proof housing designed to make installation simple
- Lockable to secure the system during maintenance (power locked off)
- For professional installation of pumping systems
- Internal touch protection with screws
- Designed to be used with LORENTZ PS2-150 to PS2 4000 systems

Ordering and shipping information

- Item no: 19-000125
- Product name: PV Disconnect 440-40-1
- Packed volume 0.01 m^3 (0.35 ft^3)
- Packed weight 1.9 kg (4.2 lbs)

Technical data / Specifications

Maximum voltage	440 V DC	
Maximum current per string	40 A	
Maximum total current	40 A	
Number of strings.	1	
Input cables	4 - 10 mm^2	AWG 12 - 8
Output cables	4 - 10 mm^2	AWG 12 - 8
PG glands (input)	2 x M16	
PG glands (output)	2 x M16	
Lightening protection mounting hole	PG16 cap	
Environmental protection	IP68	NEMA6
Housing material	Polycarbonate	

Approvals and standards

- Switch IEC 60947-3

CE

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V210201

Optional lightning surge protector

Provides protection for the pump controller from incomming high voltages on the PV side. The surge protector connects through a pre-drilled and blanked mounting hole in the PV connect housing

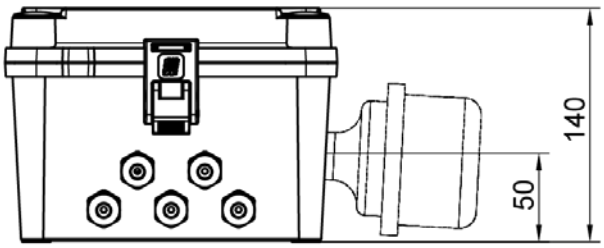
- Proper grounding of the device is required to achieve protection
- Item no.: 19-002120 MNSPD-115 PS2-150 to PS2-200
- Item no.: 19-002130 MNSPD-300 PS2-600 to PS2-1800
- Item no.: 19-002140 MNSPD-600 PS2-4000

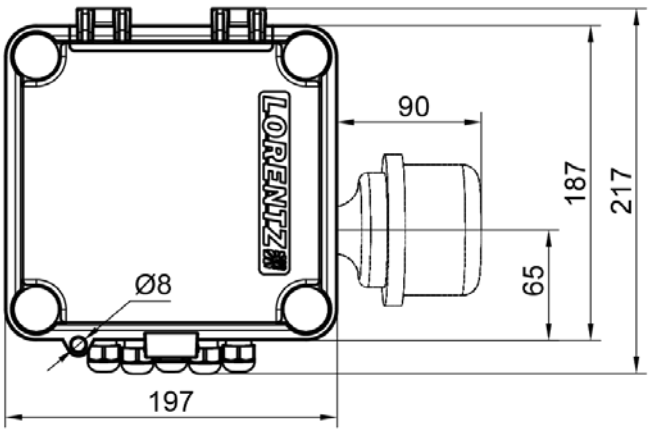
Mounting options

- Wall mount using 4 holes with weather protection
- Designed for optional pole mounting. Mounting points are pre-marked inside the housing.

Dimensions and weight

- See diagram for mm sizes
- Max height 220 mm (8.66")
- Max width (no surge protector) 197 mm (7.75")
- Max width (surge protector) 297 mm (Max 11.7")
- depth 140 mm (5.5")
- Weight 1403 g (3.1 lbs)





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PS2 Manual Speed Controller

Device to provide manual motor speed control of PS2 systems

The LORENTZ PS2 Manual Speed Controller allows adjustment of the maximum motor speed without using the PumpScanner App. To use the Manual Speed Controller, it is required to activate this function in the settings of PumpScanner during or before installation.

ORDER INFORMATION

- Item no.: 19-000035 Product name: PS2 Manual Speed Controller

FEATURES

- Allows manual control of PS2 motor speed
- Outdoor rated, installed in the housing of the controller

TECHNICAL DATA

- Voltage: 15-24 V DC
- Enclosure class: IP65
- Ambient temperature: -38…50 °C (-36… 122 F)
- Wire size: 2 x 0,75 mm²/18 AWG
- Replaces Ø 20mm cable gland
- Meets the requirements for CE
- Please note that if “Manual Speed Controller” is configured then “Set speed limitation” function is not available in PumpScanner.

DIMENSION/WEIGHT

- Packing dimension : 100 x 70 x 35 mm; 3.9 x 2.7 x 1.3 in
- Total weight: 0.2 kg / 0.4 lbs

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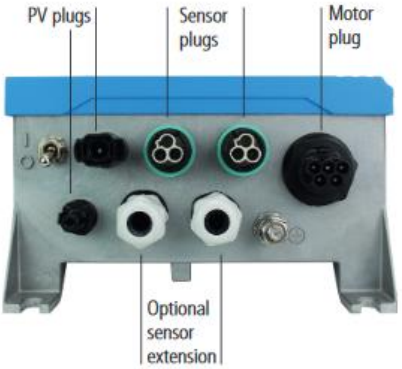
V180903

PS 2 Controller Plug Kit

Kit for an easy and electrical safe installation of PS2 Controller

The LORENTZ PS2 Controller Plug Kit can be installed on any PS2 system. The kit extends the internal wiring connections to plugs allowing systems to be pre-wired and delivered to site. Possible uses for the plug kit are where time on site needs to me minimized, where systems are often moved or where the skills available onsite do not allow for a standard installation.

The sensor extension kit allows the installation of two additional sensors, the standard set contains only two plug sets for sensor connections.



Order Information

- 19-005001 Plug- Kit PS2- Controller
- 19-005011 Sensor Plug Extension Kit

Features

- Allows fast, easy and electrical safe installation of PS2 Controller
- Customer must not open the controller for installation
- Outdoor rated, all parts are designed for outdoor use

Technical Data

PLUG	Wire size	max. current	max. voltage	Ambient temperature
Motor	max, 6mm² (10 AWG)	32 A	600V DC	-40°C … +90°C
PV	max 8mm² (8 AWG)	40 A (27A at 2.5mm² /14AWG)	1500V DC	-40°C …+90°C
Sensor	max. 1.5mm² (16 AWG)	3 A	50V DC	-40°C …+90°C

Packing Dimension/Weight

19-005001 Plug- Kit PS2- Controller

- Packing dimension: 16 x 300 x 4cm (6.3x12x1.6inch)
- Total weight: 0.33kg (0,73lb)

19-005011 Sensor Plug Extension Kit

- Packing dimension: 16 x 24 x 2cm (6.3x10x0.8inch)
- Total weight: 0.1kg (0,22lb)

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Surge Protector2

Device to Protect LORENTZ Pump Accessories from Voltage Spikes

ORDER INFORMATION

- **Item no.:** 19-005210 **product name:** Surge Protector2

FEATURES/COMPATIBILITY

- Reliable surge protection device for any switched, pulse or analogue (4-20 mA) inputs sensors including:
  - Well Probe Sensor 19-000000
  - Water Sensor 19-000001
  - Float Switch 19-000030
  - Pressure Switch 19-000310
  - Liquid Level (all types, e.g. 19-005040)
  - Liquid Pressure Sensor (all types, e.g. 19-004460)
  - Water Meter (all types, e.g. 19-002160)
  - Sun Switch (19-000050)
- The device must be installed inside the PS2 or PSk2 controller.

TECHNICAL DATA

- Max. voltage: 30 V DC
- Max current 8/20µs: 500 A
- Enclosure class: IP20
- Ambient temperature: max. 80°C (176°F)
- Wire size: 2 x 1.5mm² (AWG 16)
- Meets the requirements for CE

DIMENSION/WEIGHT

- Packing dimensions: 56 x 26 x 120 mm
  2.2 x 1.02 x 0.47 in
- Total weight 0.1 kg / 0.2 lbs

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V191120

LC330-P72

High-efficiency PV Module

Features

- high energy yields ensured by high conversion efficiency
- sturdy, clear-anodized aluminum frame with pre-drilled holes for quick installation
- advanced EVA encapsulation with triple-layer backsheet, meets the most stringent safety requirements for high-voltage operation
- pre-wired junction box equipped with connectors "plug'n'play"
- reliable bypass diodes to prevent overheating (hot spot effect) and to minimise power loss by shading
- manufactured in ISO 9001:2000-certified factory

photo may differ from actual product

Warranty

- Warranty: 2 years
- Performance guarantee:
  up to 10 years (90% power output)
  up to 20 years (80% power output)

  Details according to warranty issued by LORENTZ

Standards

LC330-P72 is certified according to IEC 61215 and 61730 by TÜV Rheinland and meets the requirements for CE.

TÜVRheinland CERTIFIED

IEC 61215
IEC 61730
Regular Production Surveillance

www.tuv.com
ID 1419063782

Specifications

Electrical Data

Peak power	Pmax	[Wp]	330
Tolerance		[%]	+6/0
Max. power current	Imp	[A]	8.84
Max. power voltage	Vmp	[V]	37.3
Short circuit current	Isc	[A]	9.55
Open circuit voltage	Voc	[V]	45.6
Temperature co-efficient for Pmax		[%/°C]	-0.43
Temperature co-efficient for Voc		[%/°C]	-0.32
Temperature co-efficient for Isc		[%/°C]	0.04
Max. system voltage		[VDC]	1,000
Module efficiency		[%]	17.09

All technical data at standard test condition:
AM = 1.5, E = 1,000W/m², cell temperature: 25 °C

Cells

Number of cells in series	72
Number of cells in parallel	1
Cell technology	polycrystalline
Cell shape	rectangular

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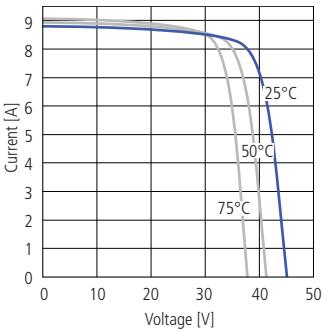
V191016

Electrical Performance

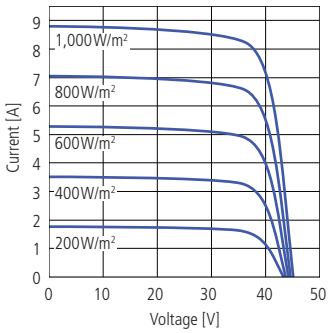
Electrical Performance

for different temperatures, at AM=1.5, E=1,000W/m²



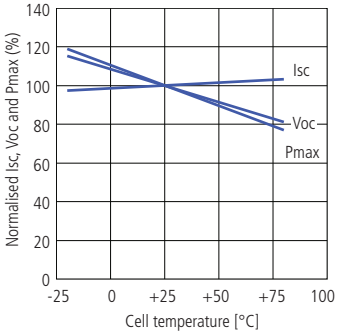
Electrical Performance

for different irradiation, at 25 °C



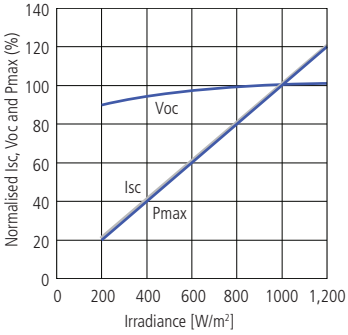
Temperature Dependence

of Isc, Voc and Pmax

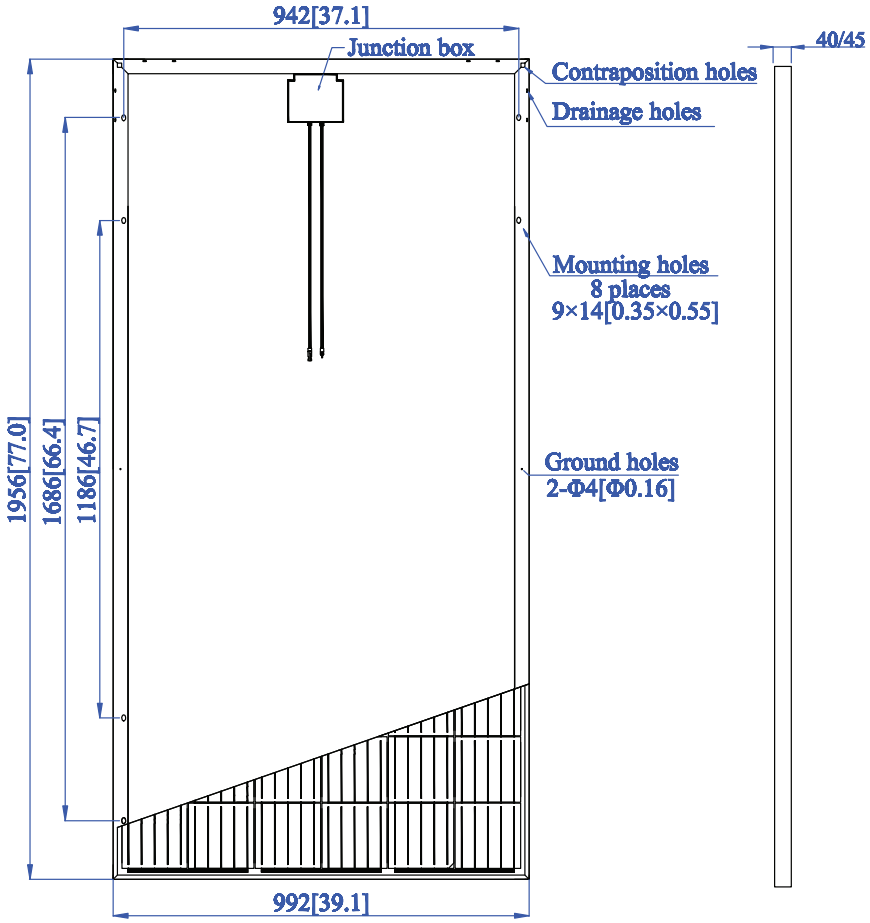


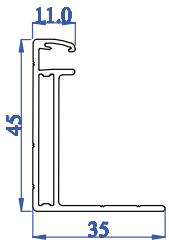
Irradiation Dependence

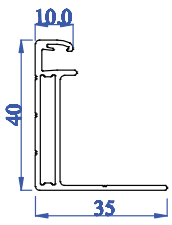
of Isc, Voc and Pmax at 25 °C



Physical Specifications mm [inch]







Weight	[kg]	20.8
Dimension	[mm]	1,956 × 992 × 40
Strength	[N/m²]	2,400
Cable		approx. 900 mm, 4 mm²
Connectors		MC4 compatible

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Friday, October 15, 2021

Nabukalu CTS- PV Sizing and Simulation

Solar pumping project

Parameter

Location:	Uganda, Jinja (0°; 33° East)	Water temperature:	25 °C		
Required daily output:	32 m³; Sizing for average month	Dirt loss:	5.0 %	Motor cable:	50 m
Pipe type:	steel, weldless, new neatly galvanized: 0.100 mm	Static head:	26 m	Pipe length:	33 m

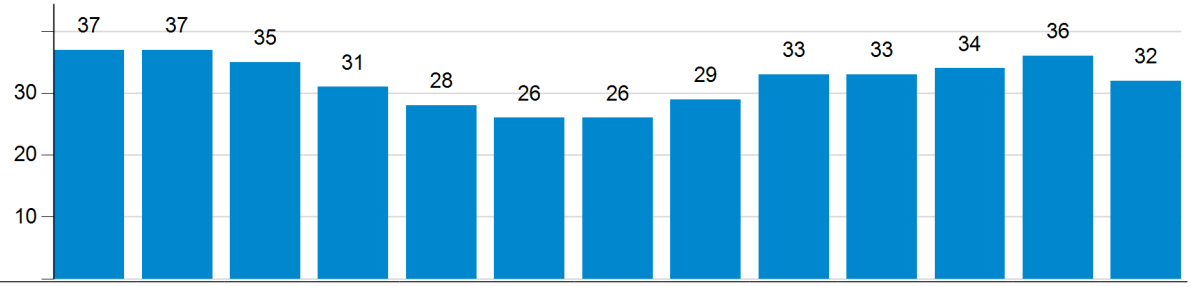
Products

	Quantity	Details
PS2-1800 HRE-32-2	1 pc.	Submersible pump system including controller with DataModule, motor and pump end
LC310-P72	3 pc.	930 Wp; 3 x 1 modules; 15 ° tilted
Motor cable	50 m	6 mm² 3-phase cable for power and 1-phase cable for ground
Pipeline	33 m	50 mm (inner diameter) Pipeline
Accessories	1 set	Well Probe V2, Water Meter, PV Disconnect 440-40-1, PS2 Manual Speed Controller, PS2 Controller Plug Kit, Surge Protector2

Sun Sensor setting in PumpScanner — min. 200 W/m²

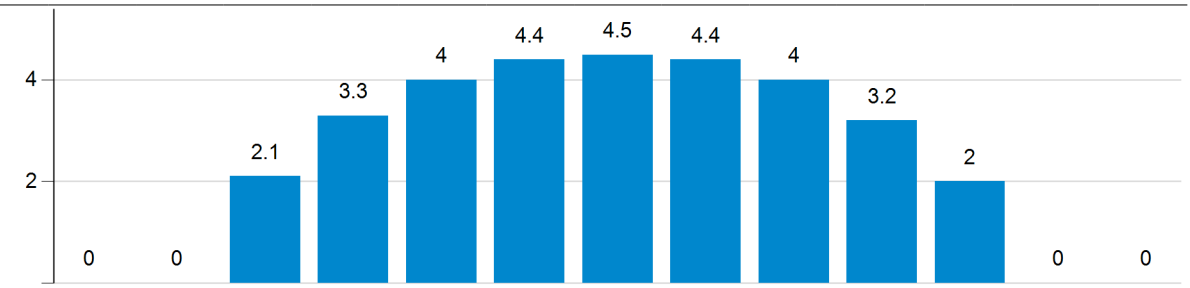
Daily output in average month — 32 m³

Daily values



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Av.
Energy [kWh]	5.1	5.2	4.8	4.2	3.8	3.6	3.6	4.0	4.5	4.6	4.6	5.0	4.4
Irradiation [kWh/m²]	6.3	6.4	5.9	5.2	4.6	4.4	4.4	4.8	5.5	5.6	5.7	6.1	5.4
Rainfall [mm]	2.0	2.5	4.4	6.7	5.5	2.9	2.4	3.2	3.7	4.6	5.1	3.1	3.8
Ambient temp. [°C]	22	23	23	22	21	21	21	21	21	21	21	22	22

Hourly values



	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00
Energy [kWh]	0	0.13	0.29	0.42	0.52	0.57	0.59	0.57	0.51	0.41	0.28	0.13	0
Irradiation [kWh/m²]	0	0.15	0.33	0.50	0.63	0.71	0.74	0.71	0.63	0.50	0.33	0.15	0
Ambient temp. [°C]	17	17	18	20	22	24	26	27	27	27	27	26	26

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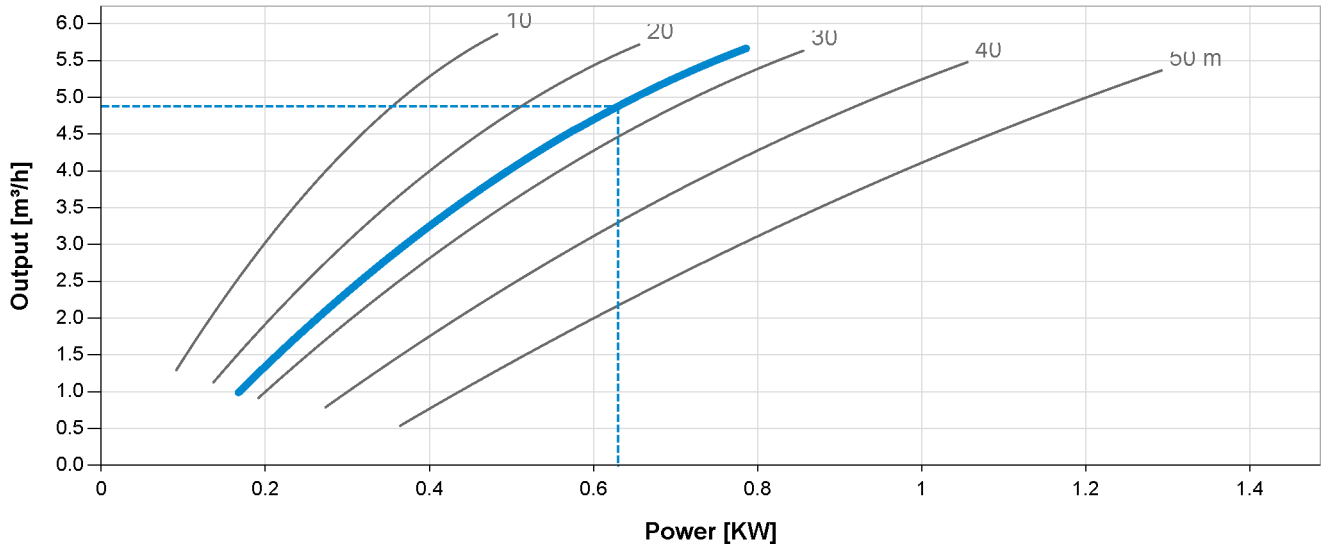
Nabukalu CTS- PV Sizing and Simulation

Solar pumping project

System characteristic



			Min.	800 W/m², 20 °C	Max./STC*
PV generator	Cell temperature	[°C]		46	25
	Temperature loss	[%]		8.8	-
	Dirt loss	[%]		5.0	-
	Pmax	[Wp]		644	930
	Vmp	[V]		103	113
	Imp	[A]		6.3	8
	Voc	[V]		125	137
	Isc	[A]		6.8	9
	Pout	[W]		644	-
	Vout	[V]		103	-
	Iout	[A]		6.3	-
Motor cable	Power loss	[%]	1.8	1.9	4.6
Pump systems	Motor power	[W]	167	630	786
	Motor voltage	[V EC]	32	98	115
	Motor current	[A]	5.2	6.4	6.9
	Motor speed	[rpm]	903	2,895	3,295
	Flow rate	[m³/h]	1.00	4.9	5.7
	Efficiency	[%]	40	55	57
Pipeline	Flow speed	[m/s]	0.14	0.69	0.80
	Friction loss	[m]	0.022	0.44	0.57

*STC: Standard test conditions for photovoltaic modules, 1000 W/m² solar irradiance, 25 °C cell temperature

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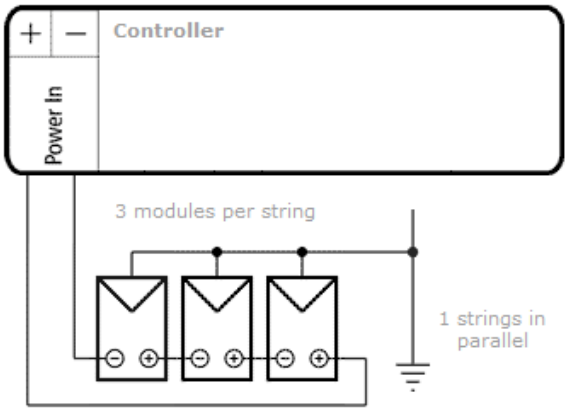
Solar pumping project

Wiring diagram



Grounding should be done according to the instructions of the module manufacturer.

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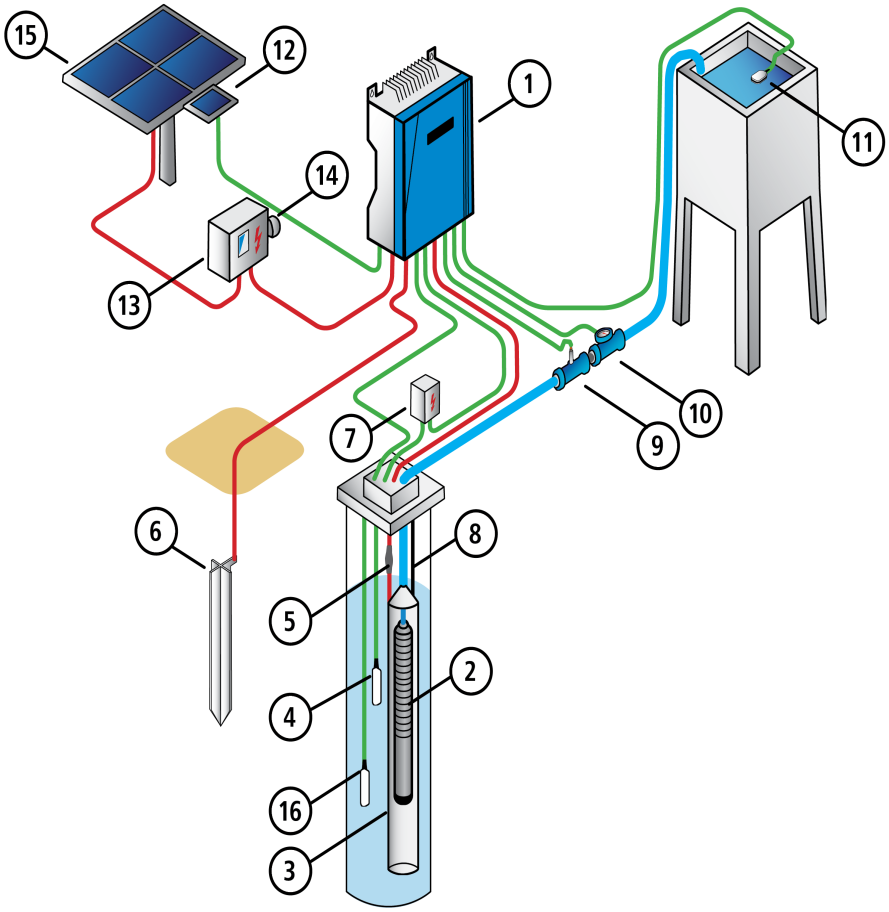
Nabukalu CTS- PV Sizing and Simulation

Solar pumping project

System Layout



1: PS2 Controller	**11:** Float Switch
2: Submersible Pump	**12:** Sun Switch
3: Flow Sleeve	**13:** PV Disconnect
4: Well Probe	**14:** Lightning Surge Protector
5: Cable Splice Kit	**15:** PV Generator
6: Grounding Rod	*It is recommended to install a Surge Protector at each controller sensor input.
7: Surge Protector*	
8: Safety Rope	
9: Water Meter	
10: Pressure Sensor	

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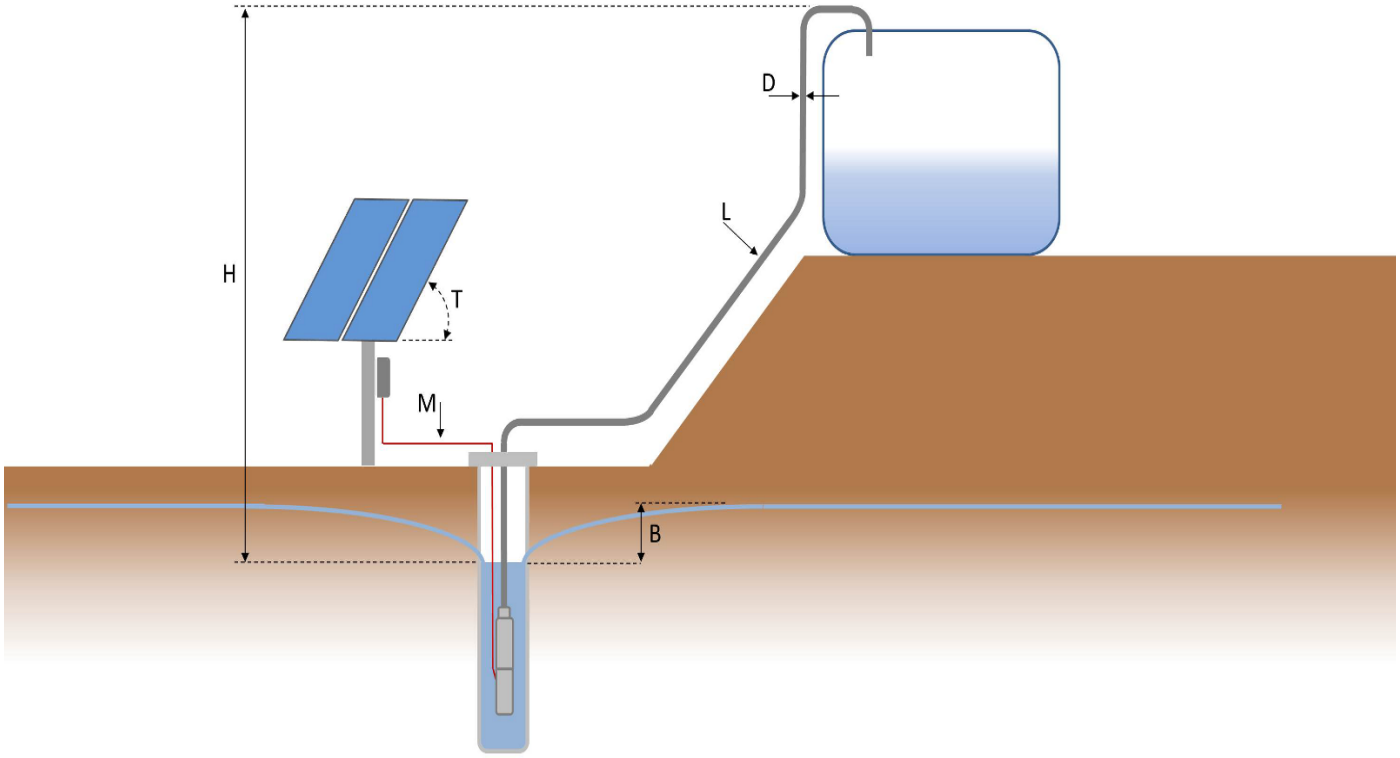
Solar pumping project

Sizing Layout



H (Static head):	Vertical height from the dynamic water level to the highest point of delivery.
B (Drawdown):	Lowering of water level depending on flow rate and recovery rate of the well.
D (Pipeline inner diameter)	
L (Pipe length):	Entire pipeline from the pump outlet to the point of delivery. Ellbows and armatures must be added as an equivalent length of pipeline.
M (Motor cable):	The cable between controller and pump unit.
T (Tilt angle):	Angle of the PV generator surface from the horizontal plane.

Well Probe V2

Mechanical float switch for dry run protection of LORENTZ solar pumps

The well probe provides a reliable method of run dry protection for LORENTZ pumps. The well probe detects that water is present within a well, tank or other water source. The well probe is typically attached to the riser pipe above the pump and connected to the controller. When the well probe becomes dry (water level is below the probe) the pump switches off to avoid dry running.

Order Information

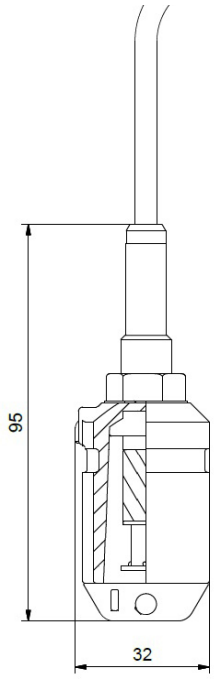
Item no.: 19-000005 **Product name:** Well probe sensor V2

Features

- Reliable dry run protection
- Simple to install using 3 cable ties
- Improved tolerance to dirt
- Splicing kit and cable ties for fixing are included

Technical Data

- Max. operating temperature 55°C
- Enclosure class: IP68
- Submersion depth: max 50 m (164 ft)
- Cable length: 1.5 m
- Wire size: 2 x 0.50 mm² or AWG 20, waterproofed
- Must be mounted in a vertical position
- Meets the requirements for CE



Dimensions / Weight

- Packaging dimensions: 255 x 170 x 40 mm
  10.0 x 6.7 x 1.6 in
- Total weight: 0.1 kg / 0.2 lbs

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WP Water Meter

The WP (Woltman) Water Meter is suitable for applications with a pipe size from DN50 to DN200.

Features

- Dry dial register ensures clear reading
- Low pressure loss, long working life
- Easy to install
- Reed switch output for easy water flow control and monitoring

Technical Data

- Water temperature 40°C
- Water pressure: max. 16 bar
- IP64
- CE Conformity

CE

Order information

item number	description
19-002165	water meter, WP-DN50, 0.1 cbm/p
19-002170	water meter, WP-DN65, 0.1 cbm/p
19-002180	water meter, WP-DN80, 0.1 cbm/p
19-002190	water meter, WP-DN100, 0.1 cbm/p
19-002200	water meter, WP-DN125, 0.1 cbm/p
19-002210	water meter, WP-DN150, 0.1 cbm/p
19-002202	water meter, WP-DN200, 0.1 cbm/p

Accuracy Curve

The Accuracy curve shows the deviation in percent for different flow rates. In regular operation the deviation is between -2% and +2%.

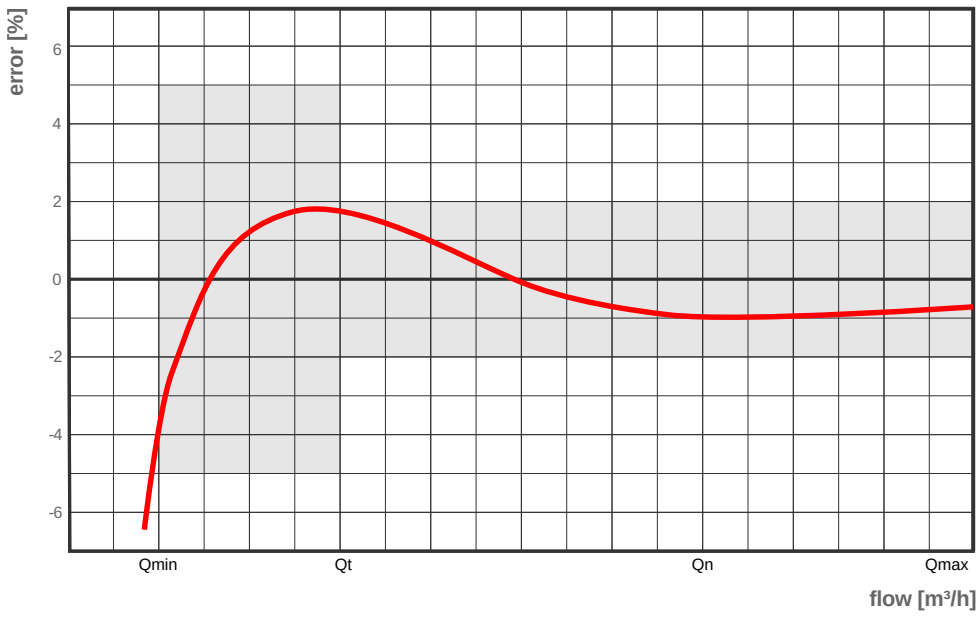
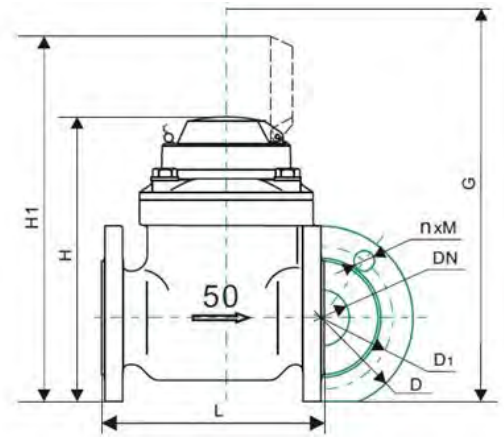


Table 1: WP - Flow rate characterisitics

	DN50	DN65	DN80	DN100	DN125	DN150	DN200
max. flow rate: Q_{max} [m³/h]	30	50	80	120	200	300	500
nominal flow rate: Q_n [m³/h]	15	25	40	60	100	150	250
transition flow rate: Q_t [m³/h]	3.0	5.0	8.0	12	20	30	50
minimum flow rate: Q_{min} [m³/h]	0.7	0.75	1.2	1.8	3.0	4.5	7.5

Table 2: WP - Dimensions, weight specifications

	DN50	DN65	DN80	DN100	DN125	DN150	DN200
L [mm]	200	200	225	250	250	300	350
H [mm]	232	242	252	262	275	325	355
H1 [mm]	303	313	323	333	346	396	426
G [mm]	360	360	360	360	360	420	420
D [mm]	165	185	200	220	250	285	340
D [mm]	125	145	160	180	210	240	295
Connecting bolt quantity	4xM16	4xM16	8xM16	8xM16	8xM16	8xM20	12xM20
Weight [kg]	12	13	16	18	20	42	74



About LORENTZ

LORENTZ is the global market leader in solar powered water pumping solutions. Founded in Germany during 1993 LORENTZ has pioneered, innovated and excelled in the engineering and manufacturing of solar powered water pumping. Today LORENTZ is active in over 130 countries through a dedicated network of professional partners. LORENTZ technology uses the power of the sun to pump water, sustaining and enhancing the life of millions of people, their livestock and crops.

Simply – ***Sun. Water. Life.***

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v210602

PV Disconnect 440-40-1

Connection box with DC disconnect

Description

An outdoor rated, combining connection box with DC disconnect switch that allows 1 strings of PV modules to be connected safely to a solar pump system.

The PV disconnect is also designed to accept an optional lightning protection device.

photo may differ from actual product

Features

- DC rated disconnect to provide safe isolation of the system
- Robust weather proof housing designed to make installation simple
- Lockable to secure the system during maintenance (power locked off)
- For professional installation of pumping systems
- Internal touch protection with screws
- Designed to be used with LORENTZ PS2-150 to PS2 4000 systems

Ordering and shipping information

- Item no: 19-000125
- Product name: PV Disconnect 440-40-1
- Packed volume 0.01 m^3 (0.35 ft^3)
- Packed weight 1.9 kg (4.2 lbs)

Technical data / Specifications

Maximum voltage	440 V DC	
Maximum current per string	40 A	
Maximum total current	40 A	
Number of strings.	1	
Input cables	4 - 10 mm^2	AWG 12 - 8
Output cables	4 - 10 mm^2	AWG 12 - 8
PG glands (input)	2 x M16	
PG glands (output)	2 x M16	
Lightening protection mounting hole	PG16 cap	
Environmental protection	IP68	NEMA6
Housing material	Polycarbonate	

Approvals and standards

- Switch IEC 60947-3

CE

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V210201

Optional lightning surge protector

Provides protection for the pump controller from incomming high voltages on the PV side. The surge protector connects through a pre-drilled and blanked mounting hole in the PV connect housing

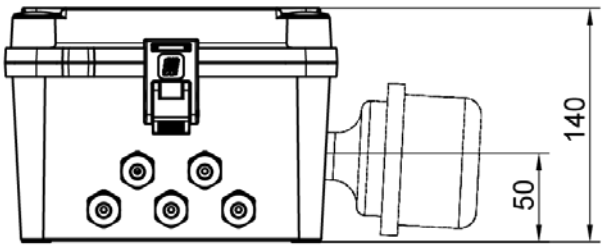
- Proper grounding of the device is required to achieve protection
- Item no.: 19-002120 MNSPD-115 PS2-150 to PS2-200
- Item no.: 19-002130 MNSPD-300 PS2-600 to PS2-1800
- Item no.: 19-002140 MNSPD-600 PS2-4000

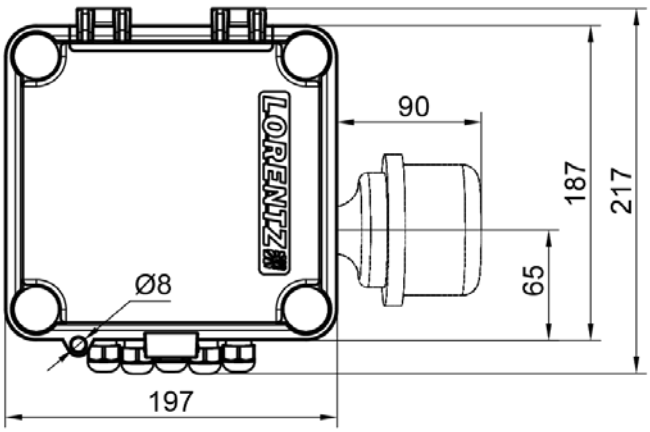
Mounting options

- Wall mount using 4 holes with weather protection
- Designed for optional pole mounting. Mounting points are pre-marked inside the housing.

Dimensions and weight

- See diagram for mm sizes
- Max height 220 mm (8.66")
- Max width (no surge protector) 197 mm (7.75")
- Max width (surge protector) 297 mm (Max 11.7")
- depth 140 mm (5.5")
- Weight 1403 g (3.1 lbs)





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PS2 Manual Speed Controller

Device to provide manual motor speed control of PS2 systems

The LORENTZ PS2 Manual Speed Controller allows adjustment of the maximum motor speed without using the PumpScanner App. To use the Manual Speed Controller, it is required to activate this function in the settings of PumpScanner during or before installation.

ORDER INFORMATION

- Item no.: 19-000035 Product name: PS2 Manual Speed Controller

FEATURES

- Allows manual control of PS2 motor speed
- Outdoor rated, installed in the housing of the controller

TECHNICAL DATA

- Voltage: 15-24 V DC
- Enclosure class: IP65
- Ambient temperature: -38…50 °C (-36… 122 F)
- Wire size: 2 x 0,75 mm²/18 AWG
- Replaces Ø 20mm cable gland
- Meets the requirements for CE
- Please note that if “Manual Speed Controller” is configured then “Set speed limitation” function is not available in PumpScanner.

DIMENSION/WEIGHT

- Packing dimension : 100 x 70 x 35 mm; 3.9 x 2.7 x 1.3 in
- Total weight: 0.2 kg / 0.4 lbs

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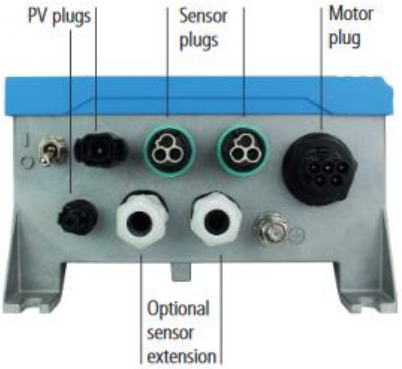
V180903

PS 2 Controller Plug Kit

Kit for an easy and electrical safe installation of PS2 Controller

The LORENTZ PS2 Controller Plug Kit can be installed on any PS2 system. The kit extends the internal wiring connections to plugs allowing systems to be pre-wired and delivered to site. Possible uses for the plug kit are where time on site needs to me minimized, where systems are often moved or where the skills available onsite do not allow for a standard installation.

The sensor extension kit allows the installation of two additional sensors, the standard set contains only two plug sets for sensor connections.



Order Information

- 19-005001 Plug- Kit PS2- Controller
- 19-005011 Sensor Plug Extension Kit

Features

- Allows fast, easy and electrical safe installation of PS2 Controller
- Customer must not open the controller for installation
- Outdoor rated, all parts are designed for outdoor use

Technical Data

PLUG	Wire size	max. current	max. voltage	Ambient temperature
Motor	max, 6mm² (10 AWG)	32 A	600V DC	-40°C … +90°C
PV	max 8mm² (8 AWG)	40 A (27A at 2.5mm² /14AWG)	1500V DC	-40°C …+90°C
Sensor	max. 1.5mm² (16 AWG)	3 A	50V DC	-40°C …+90°C

Packing Dimension/Weight

19-005001 Plug- Kit PS2- Controller

- Packing dimension: 16 x 300 x 4cm (6.3x12x1.6inch)
- Total weight: 0.33kg (0,73lb)

19-005011 Sensor Plug Extension Kit

- Packing dimension: 16 x 24 x 2cm (6.3x10x0.8inch)
- Total weight: 0.1kg (0,22lb)

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Surge Protector2

Device to Protect LORENTZ Pump Accessories from Voltage Spikes

ORDER INFORMATION

- **Item no.:** 19-005210 **product name:** Surge Protector2

FEATURES/COMPATIBILITY

- Reliable surge protection device for any switched, pulse or analogue (4-20 mA) inputs sensors including:
  - Well Probe Sensor 19-000000
  - Water Sensor 19-000001
  - Float Switch 19-000030
  - Pressure Switch 19-000310
  - Liquid Level (all types, e.g. 19-005040)
  - Liquid Pressure Sensor (all types, e.g. 19-004460)
  - Water Meter (all types, e.g. 19-002160)
  - Sun Switch (19-000050)
- The device must be installed inside the PS2 or PSk2 controller.

TECHNICAL DATA

- Max. voltage: 30 V DC
- Max current 8/20µs: 500 A
- Enclosure class: IP20
- Ambient temperature: max. 80°C (176°F)
- Wire size: 2 x 1.5mm² (AWG 16)
- Meets the requirements for CE

DIMENSION/WEIGHT

- Packing dimensions: 56 x 26 x 120 mm
  2.2 x 1.02 x 0.47 in
- Total weight 0.1 kg / 0.2 lbs

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V191120

PS2-1800 HRE-32

Solar Submersible Pump System for 4" wells

System Overview

Head	max. 50 m
Flow rate	max. 5.9 m³/h

Technical Data

Controller PS2-1800

- Controlling and monitoring
- Control inputs for dry running protection, remote control etc.
- Protected against reverse polarity, overload and overtemperature
- Integrated MPPT (Maximum Power Point Tracking)
- Battery operation: Integrated low voltage disconnect
- Integrated Sun Sensor

Power	max. 1.8 kW
Input voltage	max. 200 V
Optimum Vmp**	> 102 V
Motor current	max. 14 A
Efficiency	max. 98 %
Ambient temp.	-40...50 °C
Enclosure class	IP68

Motor ECDRIVE 1800-HRE

- Incl. 15m of 3x 2, 5 mm² plugged motor cable
- Maintenance-free brushless DC motor
- Premium materials, stainless steel: AISI 304/316
- No electronics in the motor

Rated power	1.7 kW
Efficiency	max. 92 %
Motor speed	900...3,300 rpm
Insulation class	F
Enclosure class	IP68
Submersion	max. 150 m

Pump End PE HRE-32***

- Non-return valve
- Premium materials, stainless steel: AISI 304/316
- Helical rotor pump

Efficiency	max. 65 %

Pump Unit PU1800 HRE-32 (Motor, Pump End)

Borehole diameter	min. 4,0 in
Water temperature	max. 50 °C

Standards

CE 2006/42/EC, 2004/108/EC, 2006/95/EC

IEC/EN 61702:1995, IEC/EN 62253 Ed.1

The logos shown reflect the approvals that have been granted for this product family. Products are ordered and supplied with the approvals specific to the market requirements.

**Vmp: MPP-voltage under Standard Test Conditions (STC): 1000 W/m² solar irradiance, 25 °C cell temperature

***Specify temperature range on order

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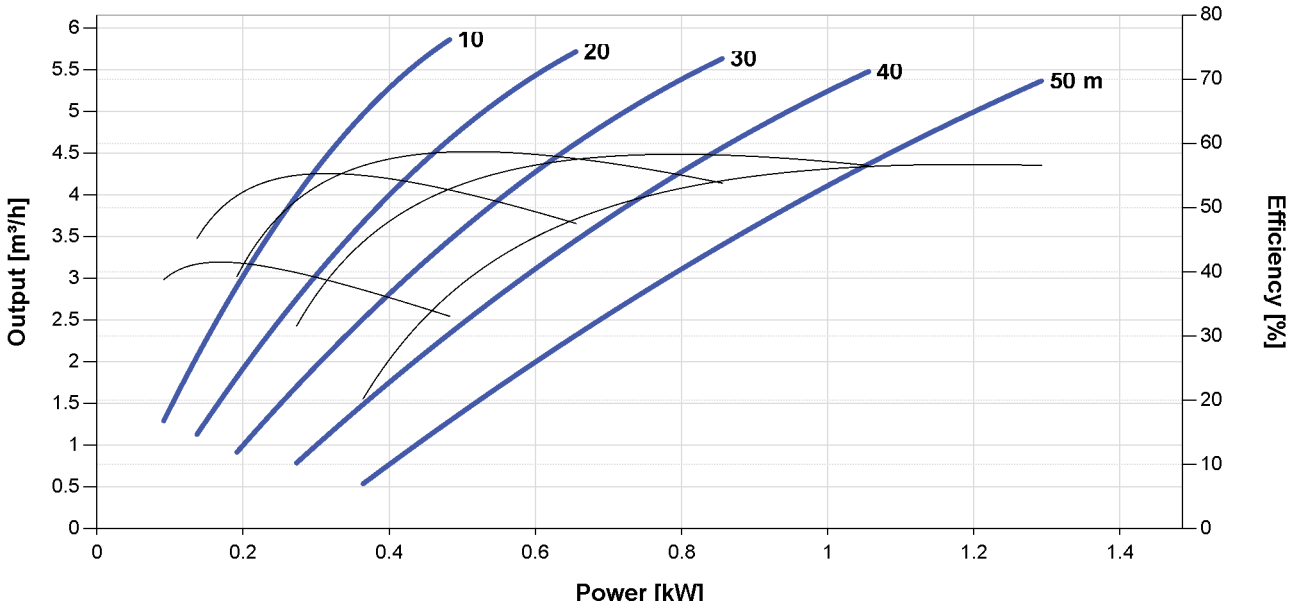
PS2-1800 HRE-32

Solar Submersible Pump System for 4" wells

Pump Chart

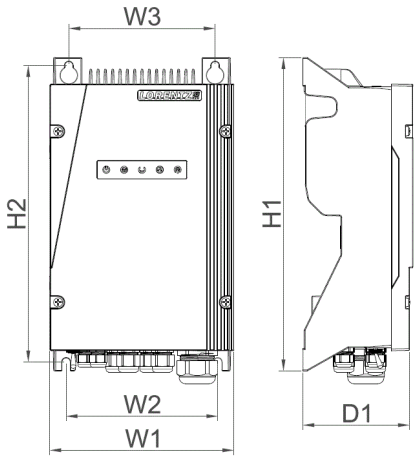
Vmp* > 102 V



Dimensions and Weights

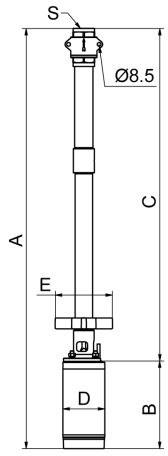
Controller

H1 = 352 mm
H2 = 333 mm
W1 = 207 mm
W2 = 170 mm
W3 = 164 mm
D1 = 124 mm



Pump Unit

A = 1,030 mm
B = 205 mm
C = 825 mm
D = 96 mm
E = 147 mm
S = 1.5 in



	Net weight
Controller	6.0 kg
Pump Unit	12 kg
Motor	6.8 kg
Pump End	5.5 kg

*Vmp: MPP-voltage under Standard Test Conditions (STC): 1000 W/m² solar irradiance, 25 °C cell temperature

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LC310-P72

High-efficiency PV Module

Features

- high energy yields ensured by high conversion efficiency
- sturdy, clear-anodized aluminum frame with pre-drilled holes for quick installation
- advanced EVA encapsulation with triple-layer backsheet, meets the most stringent safety requirements for high-voltage operation
- pre-wired junction box equipped with connectors "plug'n'play"
- reliable bypass diodes to prevent overheating (hot spot effect) and to minimise power loss by shading
- manufactured in ISO 9001:2000-certified factory

photo may differ from actual product

Warranty

- Warranty: 2 years
- Performance guarantee:
  up to 10 years (90% power output)
  up to 20 years (80% power output)

  Details according to warranty issued by LORENTZ

Standards

LC310-P72 is certified according to IEC 61215 and 61730 by TÜV Rheinland and meets the requirements for CE.

TÜVRheinland CERTIFIED

IEC 61215
IEC 61730
Regular Production Surveillance

www.tuv.com
ID 1419063782

Specifications

Electrical Data

Peak power	Pmax	[Wp]	310
Tolerance		[%]	+5/0
Max. power current	Imp	[A]	8.25
Max. power voltage	Vmp	[V]	37.6
Short circuit current	Isc	[A]	8.84
Open circuit voltage	Voc	[V]	45.7
Temperature co-efficient for Pmax		[%/°C]	-0.42
Temperature co-efficient for Voc		[%/°C]	-0.34
Temperature co-efficient for Isc		[%/°C]	0.06
Max. system voltage		[VDC]	1,000
Module efficiency		[%]	15.97
Practical module efficiency		[%]	17.69

All technical data at standard test condition:
AM = 1.5, E = 1,000W/m², cell temperature: 25 °C

Cells

Number of cells in series	72
Number of cells in parallel	1
Cell technology	polycrystalline
Cell shape	rectangular

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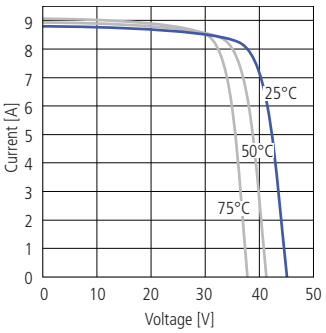
Electrical Performance

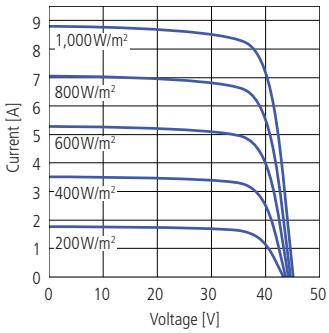
Electrical Performance

for different temperatures, at AM=1.5, E=1,000W/m²



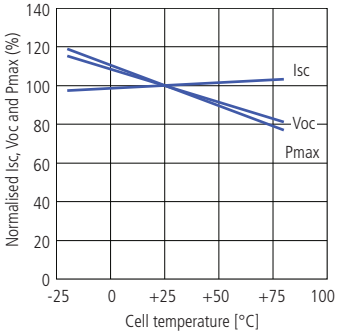
Electrical Performance

for different irradiation, at 25 °C



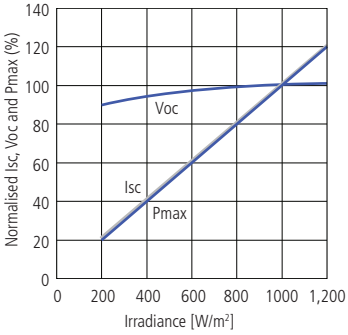
Temperature Dependence

of Isc, Voc and Pmax

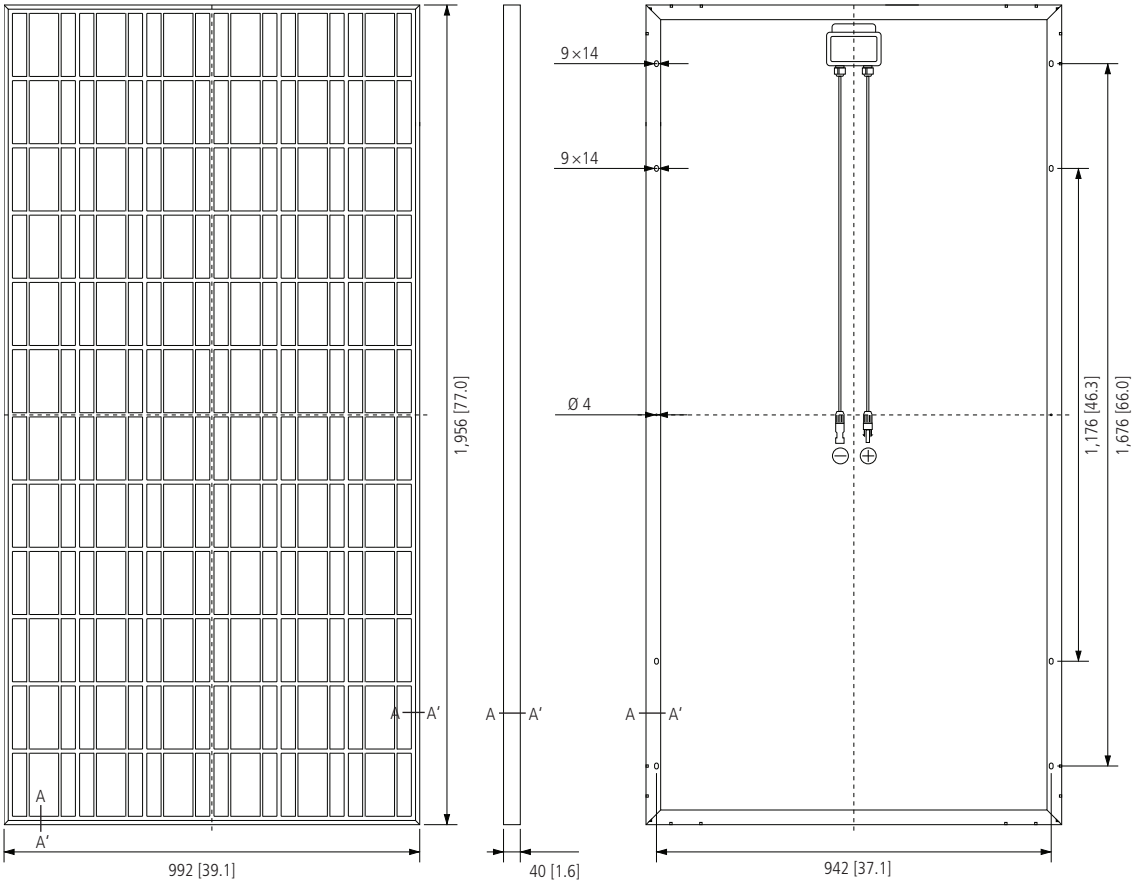


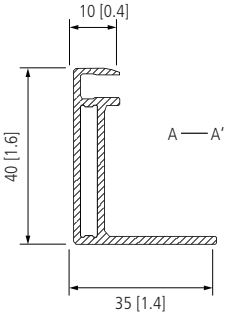
Irradiation Dependence

of Isc, Voc and Pmax at 25 °C



Physical Specifications mm





Weight	[kg]	22.0
Dimension	[mm]	1,956 × 992 × 40
Strength	[N/m²]	2,400
Cable		approx. 1200 mm, 4 mm²
Connectors		MC4 compatible

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http://www.goalglobal.org/countries/uganda

Thursday, October 14, 2021

Bulesa CTS PV Sizing and Simulation

Solar pumping project

Parameter

Location:	Uganda, Jinja (0°; 33° East)	Water temperature:	25 °C		
Required daily output:	28 m³; Sizing for average month	Dirt loss:	5.0 %	Motor cable:	60 m
Pipe type:	steel, weldless, new neatly galvanized: 0.100 mm	Static head:	45 m	Pipe length:	51 m

Products

	Quantity	Details
PS2-1800 HRE-23-2	1 pc.	Submersible pump system including controller with DataModule, motor and pump end
LC330-P72	4 pc.	1,320 Wp; 4 x 1 modules; 15 ° tilted
Motor cable	60 m	6 mm² 3-phase cable for power and 1-phase cable for ground
Pipeline	51 m	50 mm (inner diameter) Pipeline
Accessories	1 set	Well Probe V2, Water Meter, PV Disconnect 440-40-1, PS2 Manual Speed Controller, PS2 Controller Plug Kit, Surge Protector2

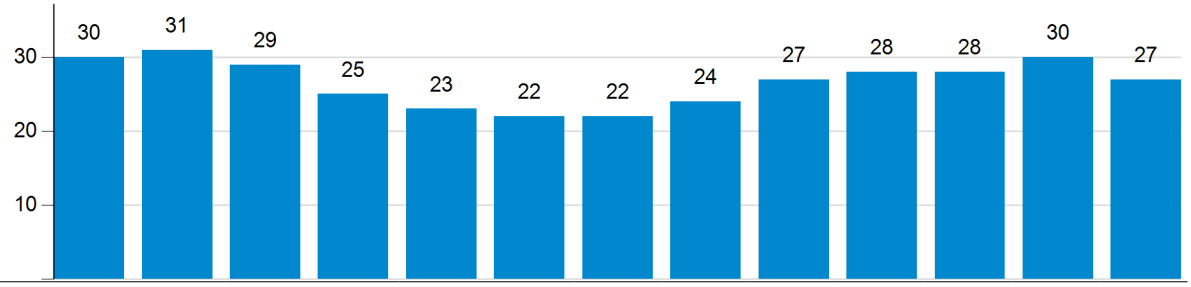
Sun Sensor setting in PumpScanner

min. 200 W/m²

Daily output in average month

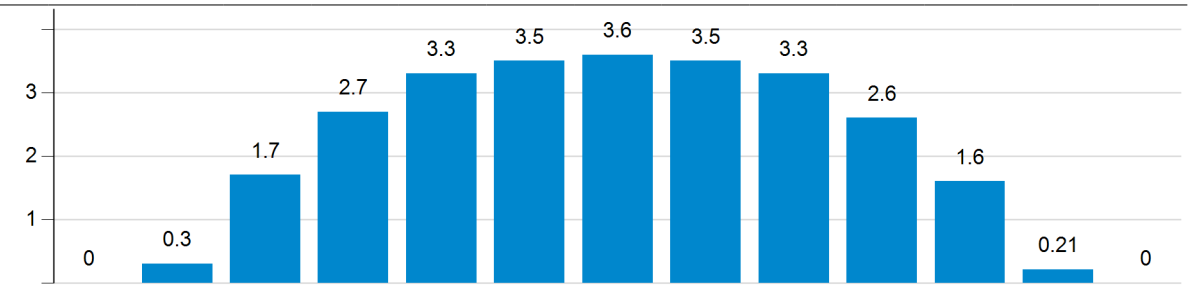
27 m³

Daily values



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Av.
Energy [kWh]	7.3	7.3	6.8	6.0	5.4	5.1	5.1	5.6	6.3	6.4	6.6	7.1	6.2
Irradiation [kWh/m²]	6.3	6.4	5.9	5.2	4.6	4.4	4.4	4.8	5.5	5.6	5.7	6.1	5.4
Rainfall [mm]	2.0	2.5	4.4	6.7	5.5	2.9	2.4	3.2	3.7	4.6	5.1	3.1	3.8
Ambient temp. [°C]	22	23	23	22	21	21	21	21	21	21	21	22	22

Hourly values



	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00
Energy [kWh]	0	0.19	0.41	0.60	0.73	0.81	0.83	0.80	0.72	0.58	0.39	0.18	0
Irradiation [kWh/m²]	0	0.15	0.33	0.50	0.63	0.71	0.74	0.71	0.63	0.50	0.33	0.15	0
Ambient temp. [°C]	17	17	18	20	22	24	26	27	27	27	27	26	26

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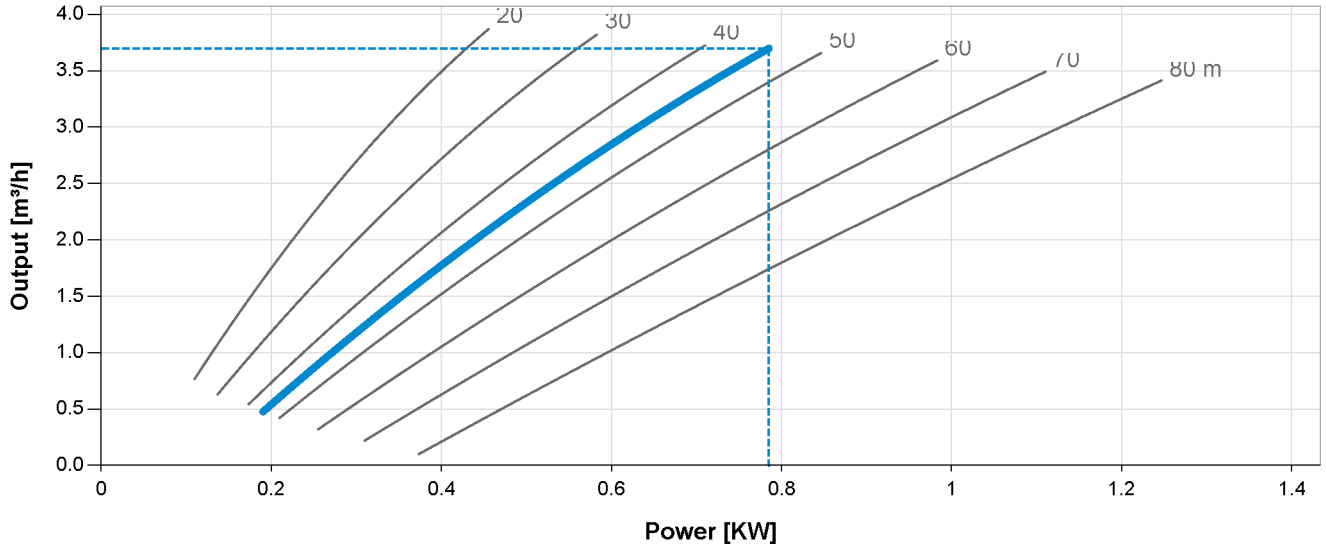
Bulesa CTS PV Sizing and Simulation

Solar pumping project

System characteristic



			Min.	800 W/m², 20 °C	Max./STC*
PV generator	Cell temperature	[°C]		46	25
	Temperature loss	[%]		9.0	-
	Dirt loss	[%]		5.0	-
	Pmax	[Wp]		913	1,320
	Vmp	[V]		136	149
	Imp	[A]		6.7	9
	Voc	[V]		167	182
	Isc	[A]		7.4	10
	Pout	[W]		810	-
	Vout	[V]		149	-
	Iout	[A]		5.7	-
Motor cable	Power loss	[%]	2.0	2.0	5.6
Pump systems	Motor power	[W]	190	785	785
	Motor voltage	[V EC]	34	116	116
	Motor current	[A]	5.6	6.8	6.8
	Motor speed	[rpm]	926	3,290	3,290
	Flow rate	[m³/h]	0.48	3.7	3.7
	Efficiency	[%]	29	57	57
Pipeline	Flow speed	[m/s]	0.068	0.52	0.52
	Friction loss	[m]	0.010	0.35	0.35

*STC: Standard test conditions for photovoltaic modules, 1000 W/m² solar irradiance, 25 °C cell temperature

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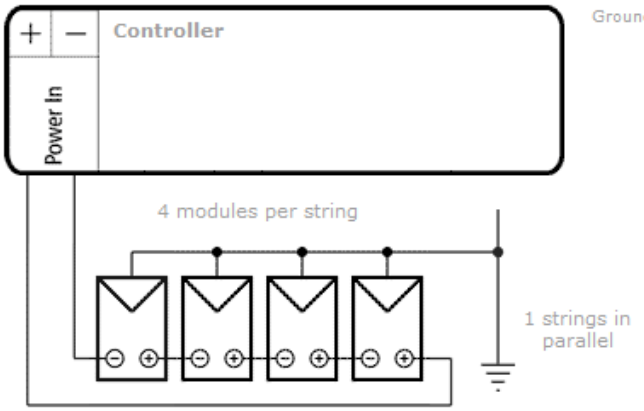
Solar pumping project

Wiring diagram



Grounding should be done according to the instructions of the module manufacturer.

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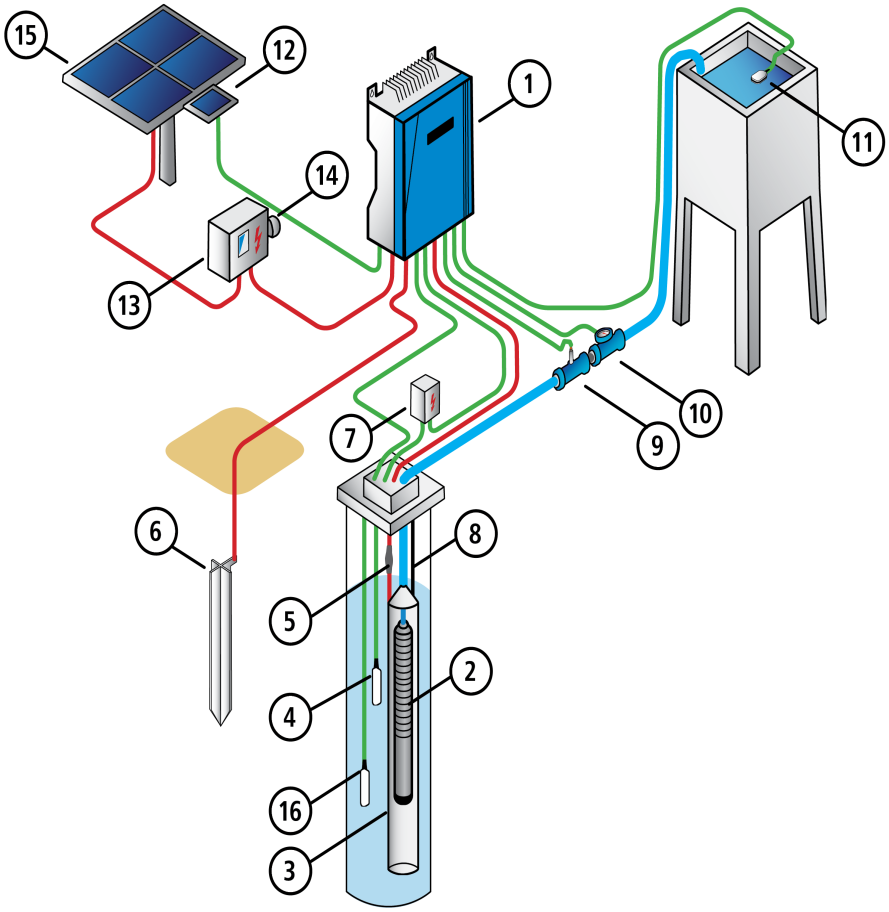
Bulesa CTS PV Sizing and Simulation

Solar pumping project

System Layout



1: PS2 Controller	**11:** Float Switch
2: Submersible Pump	**12:** Sun Switch
3: Flow Sleeve	**13:** PV Disconnect
4: Well Probe	**14:** Lightning Surge Protector
5: Cable Splice Kit	**15:** PV Generator
6: Grounding Rod	
7: Surge Protector*	
8: Safety Rope	
9: Water Meter	
10: Pressure Sensor	

*It is recommended to install a Surge Protector at each controller sensor input.

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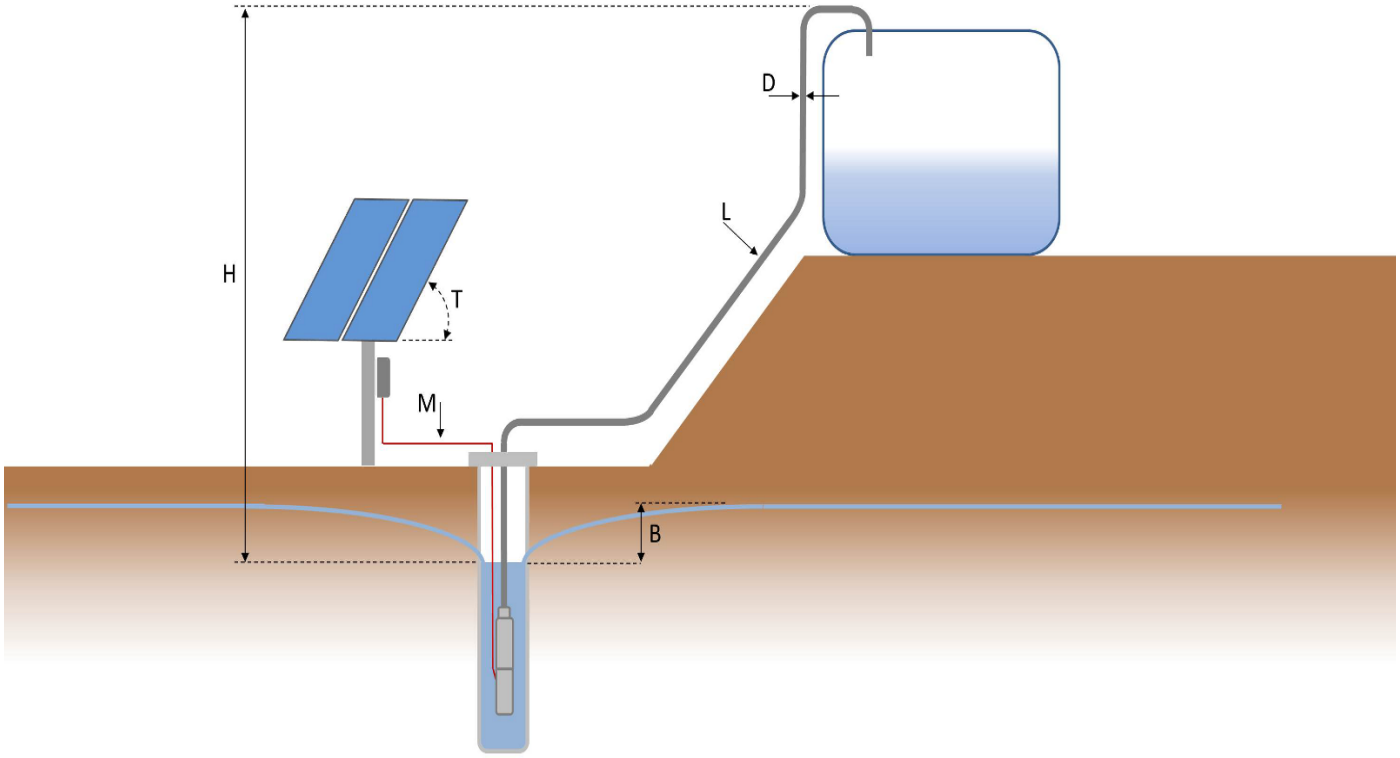
Bulesa CTS PV Sizing and Simulation

Solar pumping project

Sizing Layout



H (Static head):	Vertical height from the dynamic water level to the highest point of delivery.
B (Drawdown):	Lowering of water level depending on flow rate and recovery rate of the well.
D (Pipeline inner diameter)	
L (Pipe length):	Entire pipeline from the pump outlet to the point of delivery. Ellbows and armatures must be added as an equivalent length of pipeline.
M (Motor cable):	The cable between controller and pump unit.
T (Tilt angle):	Angle of the PV generator surface from the horizontal plane.

Well Probe V2

Mechanical float switch for dry run protection of LORENTZ solar pumps

The well probe provides a reliable method of run dry protection for LORENTZ pumps. The well probe detects that water is present within a well, tank or other water source. The well probe is typically attached to the riser pipe above the pump and connected to the controller. When the well probe becomes dry (water level is below the probe) the pump switches off to avoid dry running.

Order Information

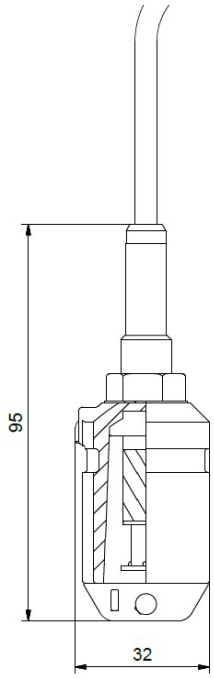
Item no.: 19-000005 **Product name:** Well probe sensor V2

Features

- Reliable dry run protection
- Simple to install using 3 cable ties
- Improved tolerance to dirt
- Splicing kit and cable ties for fixing are included

Technical Data

- Max. operating temperature 55°C
- Enclosure class: IP68
- Submersion depth: max 50 m (164 ft)
- Cable length: 1.5 m
- Wire size: 2 x 0.50 mm² or AWG 20, waterproofed
- Must be mounted in a vertical position
- Meets the requirements for CE



Dimensions / Weight

- Packaging dimensions: 255 x 170 x 40 mm
  10.0 x 6.7 x 1.6 in
- Total weight: 0.1 kg / 0.2 lbs

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WP Water Meter

The WP (Woltman) Water Meter is suitable for applications with a pipe size from DN50 to DN200.

Features

- Dry dial register ensures clear reading
- Low pressure loss, long working life
- Easy to install
- Reed switch output for easy water flow control and monitoring

Technical Data

- Water temperature 40°C
- Water pressure: max. 16 bar
- IP64
- CE Conformity

CE

Order information

item number	description
19-002165	water meter, WP-DN50, 0.1 cbm/p
19-002170	water meter, WP-DN65, 0.1 cbm/p
19-002180	water meter, WP-DN80, 0.1 cbm/p
19-002190	water meter, WP-DN100, 0.1 cbm/p
19-002200	water meter, WP-DN125, 0.1 cbm/p
19-002210	water meter, WP-DN150, 0.1 cbm/p
19-002202	water meter, WP-DN200, 0.1 cbm/p

Accuracy Curve

The Accuracy curve shows the deviation in percent for different flow rates. In regular operation the deviation is between -2% and +2%.

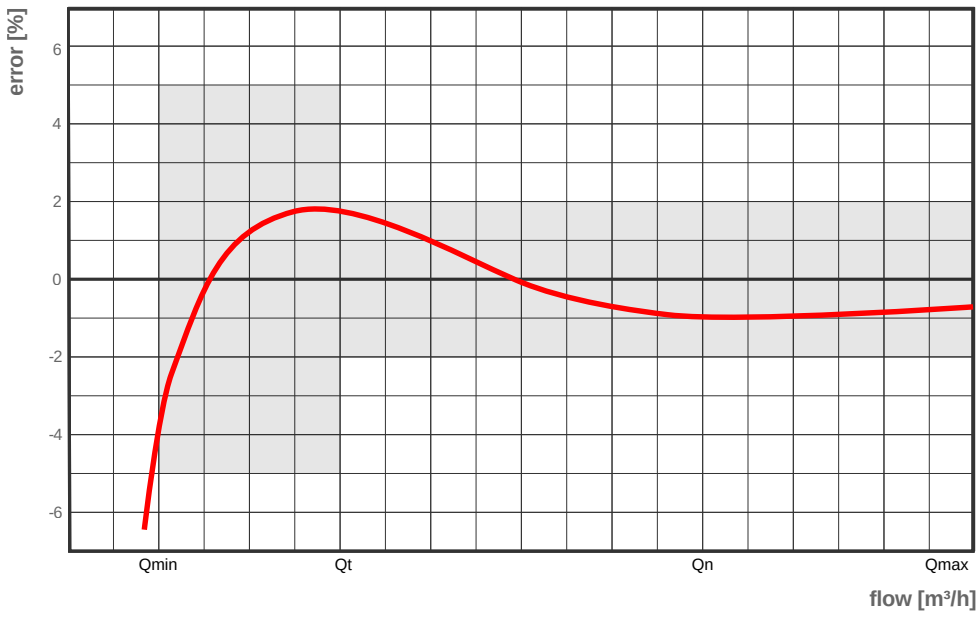
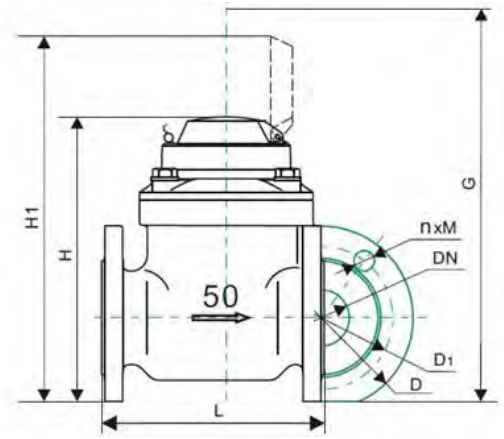


Table 1: WP - Flow rate characterisitics

	DN50	DN65	DN80	DN100	DN125	DN150	DN200
max. flow rate: Q_{max} [m³/h]	30	50	80	120	200	300	500
nominal flow rate: Q_n [m³/h]	15	25	40	60	100	150	250
transition flow rate: Q_t [m³/h]	3.0	5.0	8.0	12	20	30	50
minimum flow rate: Q_{min} [m³/h]	0.7	0.75	1.2	1.8	3.0	4.5	7.5

Table 2: WP - Dimensions, weight specifications

	DN50	DN65	DN80	DN100	DN125	DN150	DN200
L [mm]	200	200	225	250	250	300	350
H [mm]	232	242	252	262	275	325	355
H1 [mm]	303	313	323	333	346	396	426
G [mm]	360	360	360	360	360	420	420
D [mm]	165	185	200	220	250	285	340
D [mm]	125	145	160	180	210	240	295
Connecting bolt quantity	4xM16	4xM16	8xM16	8xM16	8xM16	8xM20	12xM20
Weight [kg]	12	13	16	18	20	42	74



About LORENTZ

LORENTZ is the global market leader in solar powered water pumping solutions. Founded in Germany during 1993 LORENTZ has pioneered, innovated and excelled in the engineering and manufacturing of solar powered water pumping. Today LORENTZ is active in over 130 countries through a dedicated network of professional partners. LORENTZ technology uses the power of the sun to pump water, sustaining and enhancing the life of millions of people, their livestock and crops.

Simply – ***Sun. Water. Life.***

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v210602

PV Disconnect 440-40-1

Connection box with DC disconnect

Description

An outdoor rated, combining connection box with DC disconnect switch that allows 1 strings of PV modules to be connected safely to a solar pump system.

The PV disconnect is also designed to accept an optional lightning protection device.

photo may differ from actual product

Features

- DC rated disconnect to provide safe isolation of the system
- Robust weather proof housing designed to make installation simple
- Lockable to secure the system during maintenance (power locked off)
- For professional installation of pumping systems
- Internal touch protection with screws
- Designed to be used with LORENTZ PS2-150 to PS2 4000 systems

Ordering and shipping information

- Item no: 19-000125
- Product name: PV Disconnect 440-40-1
- Packed volume 0.01 m^3 (0.35 ft^3)
- Packed weight 1.9 kg (4.2 lbs)

Technical data / Specifications

Maximum voltage	440 V DC	
Maximum current per string	40 A	
Maximum total current	40 A	
Number of strings.	1	
Input cables	4 - 10 mm^2	AWG 12 - 8
Output cables	4 - 10 mm^2	AWG 12 - 8
PG glands (input)	2 x M16	
PG glands (output)	2 x M16	
Lightening protection mounting hole	PG16 cap	
Environmental protection	IP68	NEMA6
Housing material	Polycarbonate	

Approvals and standards

- Switch IEC 60947-3

CE

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Optional lightning surge protector

Provides protection for the pump controller from incomming high voltages on the PV side. The surge protector connects through a pre-drilled and blanked mounting hole in the PV connect housing

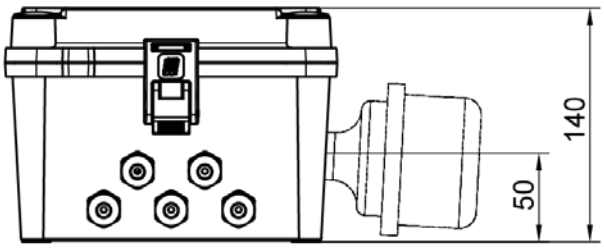
- Proper grounding of the device is required to achieve protection
- Item no.: 19-002120 MNSPD-115 PS2-150 to PS2-200
- Item no.: 19-002130 MNSPD-300 PS2-600 to PS2-1800
- Item no.: 19-002140 MNSPD-600 PS2-4000

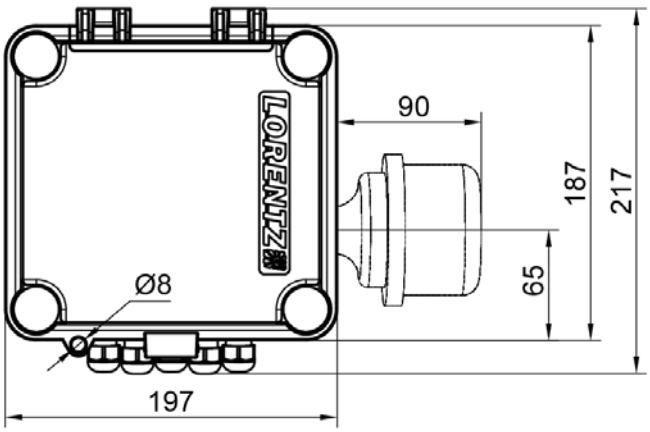
Mounting options

- Wall mount using 4 holes with weather protection
- Designed for optional pole mounting. Mounting points are pre-marked inside the housing.

Dimensions and weight

- See diagram for mm sizes
- Max height 220 mm (8.66")
- Max width (no surge protector) 197 mm (7.75")
- Max width (surge protector) 297 mm (Max 11.7")
- depth 140 mm (5.5")
- Weight 1403 g (3.1 lbs)





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PS2 Manual Speed Controller

Device to provide manual motor speed control of PS2 systems

The LORENTZ PS2 Manual Speed Controller allows adjustment of the maximum motor speed without using the PumpScanner App. To use the Manual Speed Controller, it is required to activate this function in the settings of PumpScanner during or before installation.

ORDER INFORMATION

- Item no.: 19-000035 Product name: PS2 Manual Speed Controller

FEATURES

- Allows manual control of PS2 motor speed
- Outdoor rated, installed in the housing of the controller

TECHNICAL DATA

- Voltage: 15-24 V DC
- Enclosure class: IP65
- Ambient temperature: -38…50 °C (-36… 122 F)
- Wire size: 2 x 0,75 mm²/18 AWG
- Replaces Ø 20mm cable gland
- Meets the requirements for CE
- Please note that if “Manual Speed Controller” is configured then “Set speed limitation” function is not available in PumpScanner.

DIMENSION/WEIGHT

- Packing dimension : 100 x 70 x 35 mm; 3.9 x 2.7 x 1.3 in
- Total weight: 0.2 kg / 0.4 lbs

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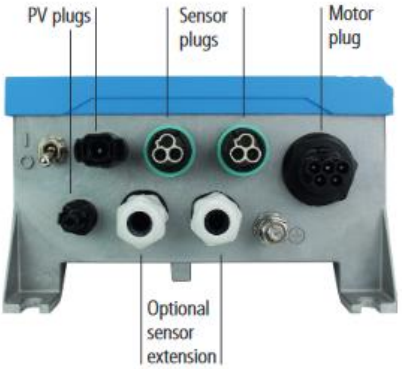
PS 2 Controller Plug Kit

Kit for an easy and electrical safe installation of PS2 Controller

The LORENTZ PS2 Controller Plug Kit can be installed on any PS2 system. The kit extends the internal wiring connections to plugs allowing systems to be pre-wired and delivered to site. Possible uses for the plug kit are where time on site needs to me minimized, where systems are often moved or where the skills available onsite do not allow for a standard installation.

The sensor extension kit allows the installation of two additional sensors, the standard set contains only two plug sets for sensor connections.



Order Information

- 19-005001 Plug- Kit PS2- Controller
- 19-005011 Sensor Plug Extension Kit

Features

- Allows fast, easy and electrical safe installation of PS2 Controller
- Customer must not open the controller for installation
- Outdoor rated, all parts are designed for outdoor use

Technical Data

PLUG	Wire size	max. current	max. voltage	Ambient temperature
Motor	max, 6mm² (10 AWG)	32 A	600V DC	-40°C … +90°C
PV	max 8mm² (8 AWG)	40 A (27A at 2.5mm² /14AWG)	1500V DC	-40°C …+90°C
Sensor	max. 1.5mm² (16 AWG)	3 A	50V DC	-40°C …+90°C

Packing Dimension/Weight

19-005001 Plug- Kit PS2- Controller

- Packing dimension: 16 x 300 x 4cm (6.3x12x1.6inch)
- Total weight: 0.33kg (0,73lb)

19-005011 Sensor Plug Extension Kit

- Packing dimension: 16 x 24 x 2cm (6.3x10x0.8inch)
- Total weight: 0.1kg (0,22lb)

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Surge Protector2

Device to Protect LORENTZ Pump Accessories from Voltage Spikes

ORDER INFORMATION

- **Item no.:** 19-005210 **product name:** Surge Protector2

FEATURES/COMPATIBILITY

- Reliable surge protection device for any switched, pulse or analogue (4-20 mA) inputs sensors including:
  - Well Probe Sensor 19-000000
  - Water Sensor 19-000001
  - Float Switch 19-000030
  - Pressure Switch 19-000310
  - Liquid Level (all types, e.g. 19-005040)
  - Liquid Pressure Sensor (all types, e.g. 19-004460)
  - Water Meter (all types, e.g. 19-002160)
  - Sun Switch (19-000050)
- The device must be installed inside the PS2 or PSk2 controller.

TECHNICAL DATA

- Max. voltage: 30 V DC
- Max current 8/20µs: 500 A
- Enclosure class: IP20
- Ambient temperature: max. 80°C (176°F)
- Wire size: 2 x 1.5mm² (AWG 16)
- Meets the requirements for CE

DIMENSION/WEIGHT

- Packing dimensions: 56 x 26 x 120 mm
  2.2 x 1.02 x 0.47 in
- Total weight 0.1 kg / 0.2 lbs

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V191120

PS2-1800 HRE-23

Solar Submersible Pump System for 4" wells

System Overview

Head	max. 80 m
Flow rate	max. 3.9 m³/h

Technical Data

Controller PS2-1800

- Controlling and monitoring
- Control inputs for dry running protection, remote control etc.
- Protected against reverse polarity, overload and overtemperature
- Integrated MPPT (Maximum Power Point Tracking)
- Battery operation: Integrated low voltage disconnect
- Integrated Sun Sensor

Power	max. 1.8 kW
Input voltage	max. 200 V
Optimum Vmp**	> 102 V
Motor current	max. 14 A
Efficiency	max. 98 %
Ambient temp.	-40...50 °C
Enclosure class	IP68

Motor ECDRIVE 1800-HRE

- Incl. 15m of 3x 2, 5 mm² plugged motor cable
- Maintenance-free brushless DC motor
- Premium materials, stainless steel: AISI 304/316
- No electronics in the motor

Rated power	1.7 kW
Efficiency	max. 92 %
Motor speed	900...3,300 rpm
Insulation class	F
Enclosure class	IP68
Submersion	max. 150 m

Pump End PE HRE-23***

- Non-return valve
- Premium materials, stainless steel: AISI 304/316
- Helical rotor pump

Efficiency	max. 67 %

Pump Unit PU1800 HRE-23 (Motor, Pump End)

Borehole diameter	min. 4,0 in
Water temperature	max. 50 °C

Standards

CE 2006/42/EC, 2004/108/EC, 2006/95/EC

IEC/EN 61702:1995, IEC/EN 62253 Ed.1

The logos shown reflect the approvals that have been granted for this product family. Products are ordered and supplied with the approvals specific to the market requirements.

**Vmp: MPP-voltage under Standard Test Conditions (STC): 1000 W/m² solar irradiance, 25 °C cell temperature

***Specify temperature range on order

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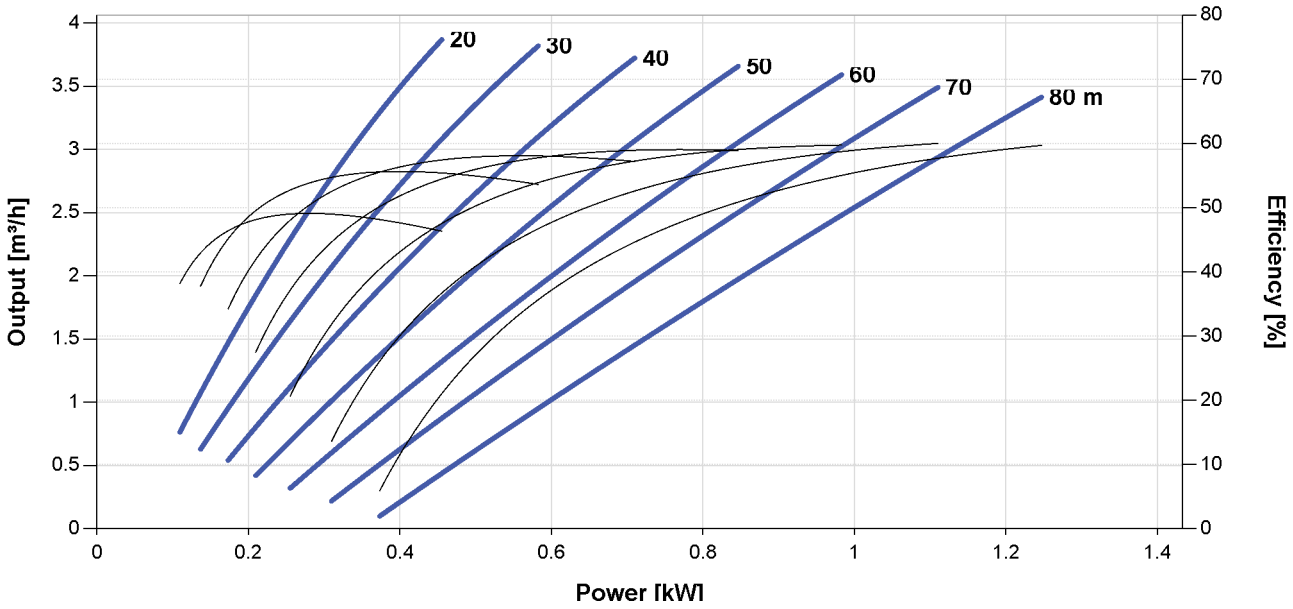
PS2-1800 HRE-23

Solar Submersible Pump System for 4" wells

Pump Chart

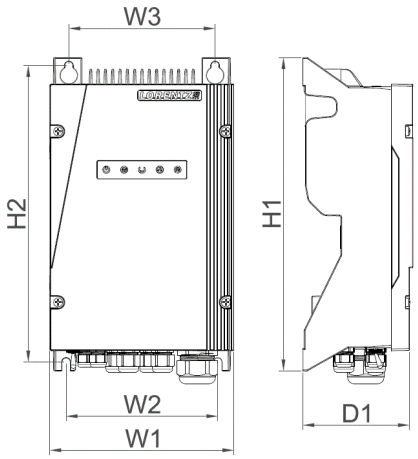
Vmp* > 102 V



Dimensions and Weights

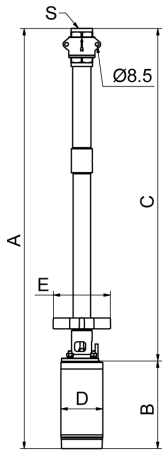
Controller

H1 = 352 mm
H2 = 333 mm
W1 = 207 mm
W2 = 170 mm
W3 = 164 mm
D1 = 124 mm



Pump Unit

A = 970 mm
B = 205 mm
C = 765 mm
D = 96 mm
E = 147 mm
S = 1.25 in



	Net weight
Controller	6.0 kg
Pump Unit	11 kg
Motor	6.8 kg
Pump End	4.5 kg

*Vmp: MPP-voltage under Standard Test Conditions (STC): 1000 W/m² solar irradiance, 25 °C cell temperature

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LC330-P72

High-efficiency PV Module

Features

- high energy yields ensured by high conversion efficiency
- sturdy, clear-anodized aluminum frame with pre-drilled holes for quick installation
- advanced EVA encapsulation with triple-layer backsheet, meets the most stringent safety requirements for high-voltage operation
- pre-wired junction box equipped with connectors "plug'n'play"
- reliable bypass diodes to prevent overheating (hot spot effect) and to minimise power loss by shading
- manufactured in ISO 9001:2000-certified factory

photo may differ from actual product

Warranty

- Warranty: 2 years
- Performance guarantee:
  up to 10 years (90% power output)
  up to 20 years (80% power output)

  Details according to warranty issued by LORENTZ

Standards

LC330-P72 is certified according to IEC 61215 and 61730 by TÜV Rheinland and meets the requirements for CE.

TÜVRheinland CERTIFIED

IEC 61215
IEC 61730
Regular Production Surveillance

www.tuv.com
ID 1419063782

Specifications

Electrical Data

Peak power	Pmax	[Wp]	330
Tolerance		[%]	+6/0
Max. power current	Imp	[A]	8.84
Max. power voltage	Vmp	[V]	37.3
Short circuit current	Isc	[A]	9.55
Open circuit voltage	Voc	[V]	45.6
Temperature co-efficient for Pmax		[%/°C]	-0.43
Temperature co-efficient for Voc		[%/°C]	-0.32
Temperature co-efficient for Isc		[%/°C]	0.04
Max. system voltage		[VDC]	1,000
Module efficiency		[%]	17.09

All technical data at standard test condition:
AM = 1.5, E = 1,000W/m², cell temperature: 25 °C

Cells

Number of cells in series	72
Number of cells in parallel	1
Cell technology	polycrystalline
Cell shape	rectangular

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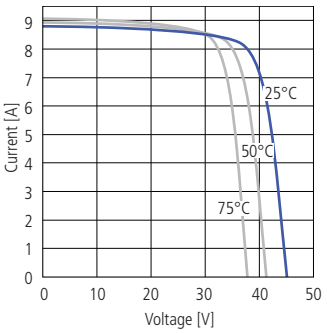
Electrical Performance

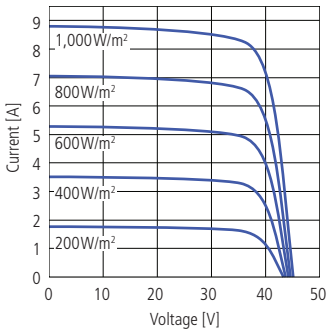
Electrical Performance

for different temperatures, at AM=1.5, E=1,000W/m²



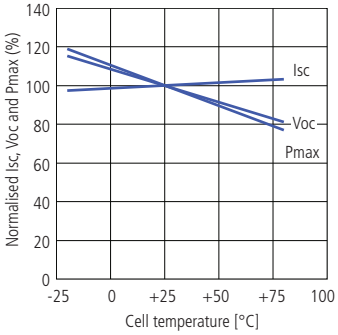
Electrical Performance

for different irradiation, at 25 °C



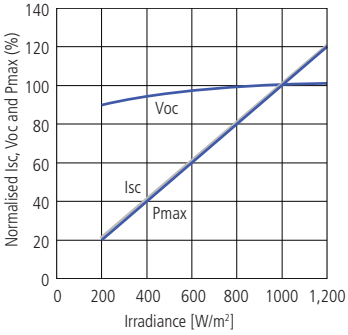
Temperature Dependence

of Isc, Voc and Pmax

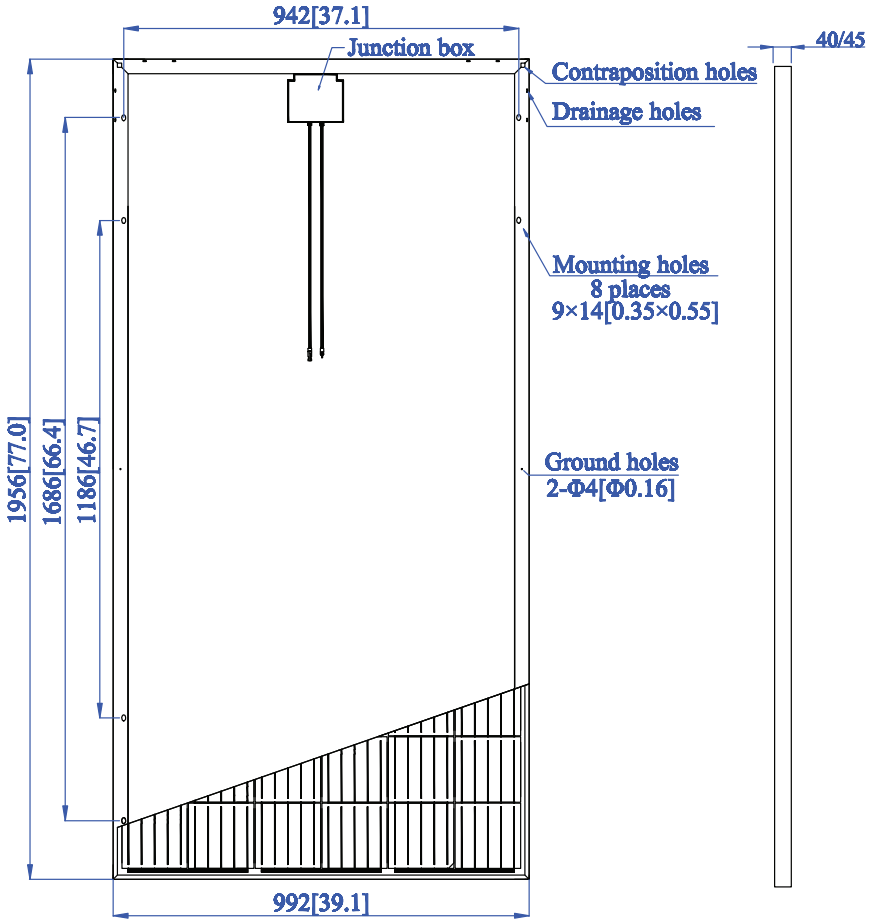


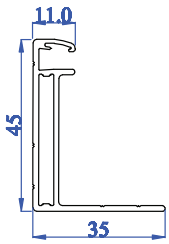
Irradiation Dependence

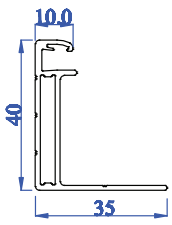
of Isc, Voc and Pmax at 25 °C



Physical Specifications mm [inch]







Weight	[kg]	20.8
Dimension	[mm]	1,956 × 992 × 40
Strength	[N/m²]	2,400
Cable		approx. 900 mm, 4 mm²
Connectors		MC4 compatible

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Tuesday, October 12, 2021

Nansuma B CTS

Solar pumping project

Parameter

Location:	Uganda, Jinja (0°; 33° East)	Water temperature:	25 °C		
Required daily output:	28 m³; Sizing for average month	Dirt loss:	5.0 %	Motor cable:	50 m
Pipe type:	steel, weldless, new neatly galvanized: 0.100 mm	Static head:	40 m	Pipe length:	42 m

Products

	Quantity	Details
PS2-1800 HRE-23-2	1 pc.	Submersible pump system including controller with DataModule, motor and pump end
LC310-P72	4 pc.	1,240 Wp; 4 x 1 modules; 15 ° tilted
Motor cable	50 m	6 mm² 3-phase cable for power and 1-phase cable for ground
Pipeline	42 m	50 mm (inner diameter) Pipeline
Accessories	1 set	Well Probe V2, Pressure Switch, Liquid Level Sensor, Liquid Pressure Sensor, Water Meter, PV Disconnect 440-40-1, PV Disconnect 440-40-3, PS2 Manual Speed Controller, PS2 Controller Plug Kit, Surge Protector2

Sun Sensor setting in PumpScanner

min. 100 W/m²

Daily output in average month

28 m³

Daily values

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Av.
Output [m³]	31	31	30	27	24	23	23	25	28	29	30	31	28
Energy [kWh]	6.8	6.9	6.4	5.6	5.1	4.8	4.8	5.3	5.9	6.1	6.2	6.6	5.9
Irradiation [kWh/m²]	6.3	6.4	5.9	5.2	4.6	4.4	4.4	4.8	5.5	5.6	5.7	6.1	5.4
Rainfall [mm]	2.0	2.5	4.4	6.7	5.5	2.9	2.4	3.2	3.7	4.6	5.1	3.1	3.8
Ambient temp. [°C]	22	23	23	22	21	21	21	21	21	21	21	22	22

Hourly values

	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00
Output [m³/h]	0	0.4	1.9	2.9	3.5	3.6	3.6	3.6	3.4	2.8	1.8	0.34	0
Energy [kWh]	0	0.18	0.38	0.56	0.69	0.76	0.78	0.75	0.68	0.54	0.37	0.17	0
Irradiation [kWh/m²]	0	0.15	0.33	0.50	0.63	0.71	0.74	0.71	0.63	0.50	0.33	0.15	0
Ambient temp. [°C]	17	17	18	20	22	24	26	27	27	27	27	26	26

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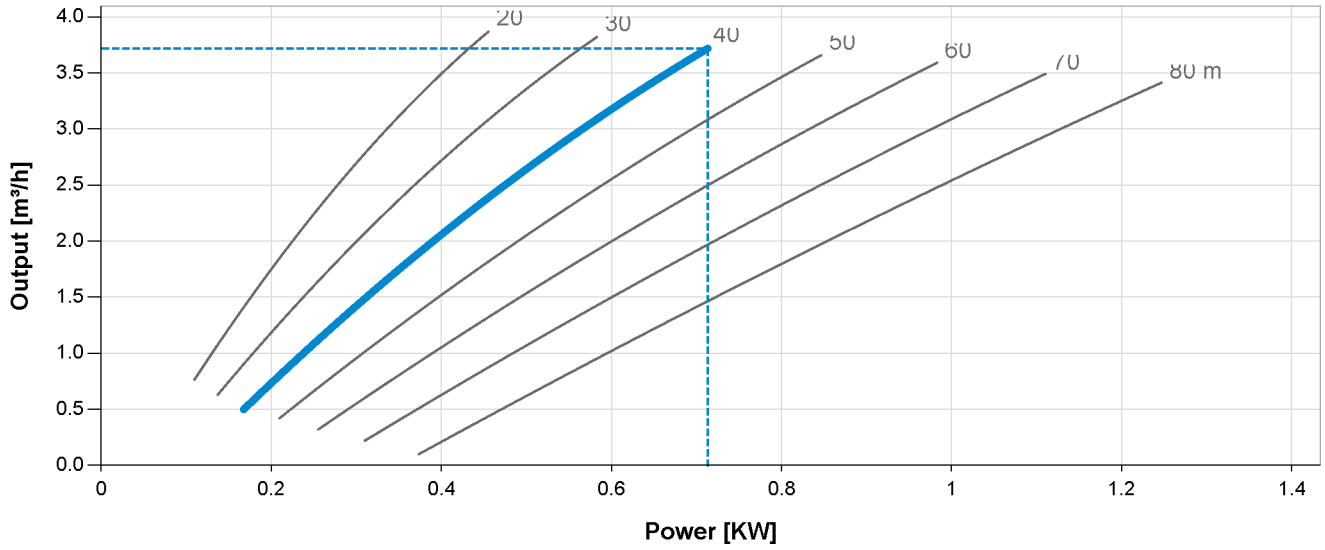
Solar pumping project

System characteristic



			Min.	800 W/m², 20 °C	Max./STC*
PV generator	Cell temperature	[°C]		46	25
	Temperature loss	[%]		8.8	-
	Dirt loss	[%]		5.0	-
	Pmax	[Wp]		859	1,240
	Vmp	[V]		137	150
	Imp	[A]		6.3	8
	Voc	[V]		167	183
	Isc	[A]		6.8	9
	Pout	[W]		734	-
	Vout	[V]		153	-
	Iout	[A]		4.7	-
Motor cable	Power loss	[%]	1.6	1.6	4.4
Pump systems	Motor power	[W]	167	713	713
	Motor voltage	[V EC]	33	115	115
	Motor current	[A]	5.1	6.2	6.2
	Motor speed	[rpm]	905	3,275	3,275
	Flow rate	[m³/h]	0.50	3.7	3.7
	Efficiency	[%]	31	56	57
Pipeline	Flow speed	[m/s]	0.071	0.53	0.53
	Friction loss	[m]	0.009	0.29	0.29

*STC: Standard test conditions for photovoltaic modules, 1000 W/m² solar irradiance, 25 °C cell temperature

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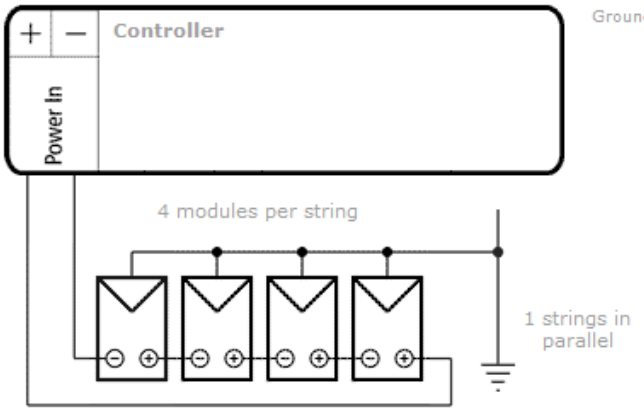
Solar pumping project

Wiring diagram



Grounding should be done according to the instructions of the module manufacturer.

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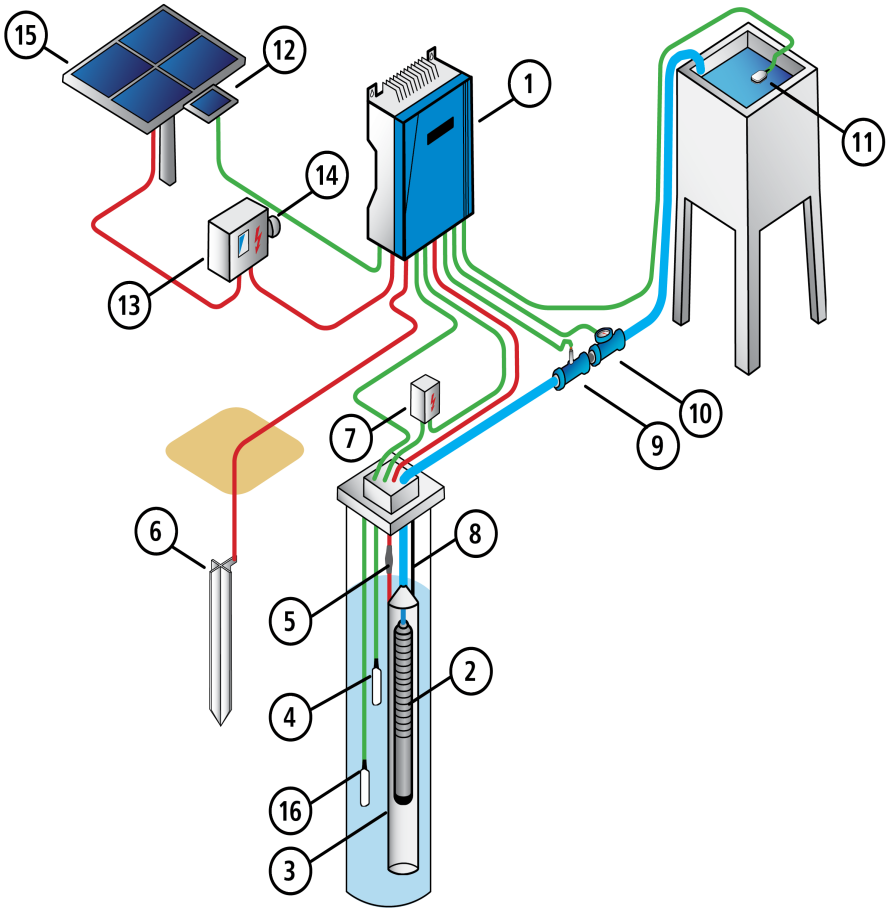
Solar pumping project

System Layout



1: PS2 Controller	**11:** Float Switch
2: Submersible Pump	**12:** Sun Switch
3: Flow Sleeve	**13:** PV Disconnect
4: Well Probe	**14:** Lightning Surge Protector
5: Cable Splice Kit	**15:** PV Generator
6: Grounding Rod	
7: Surge Protector*	
8: Safety Rope	
9: Water Meter	
10: Pressure Sensor	

*It is recommended to install a Surge Protector at each controller sensor input.

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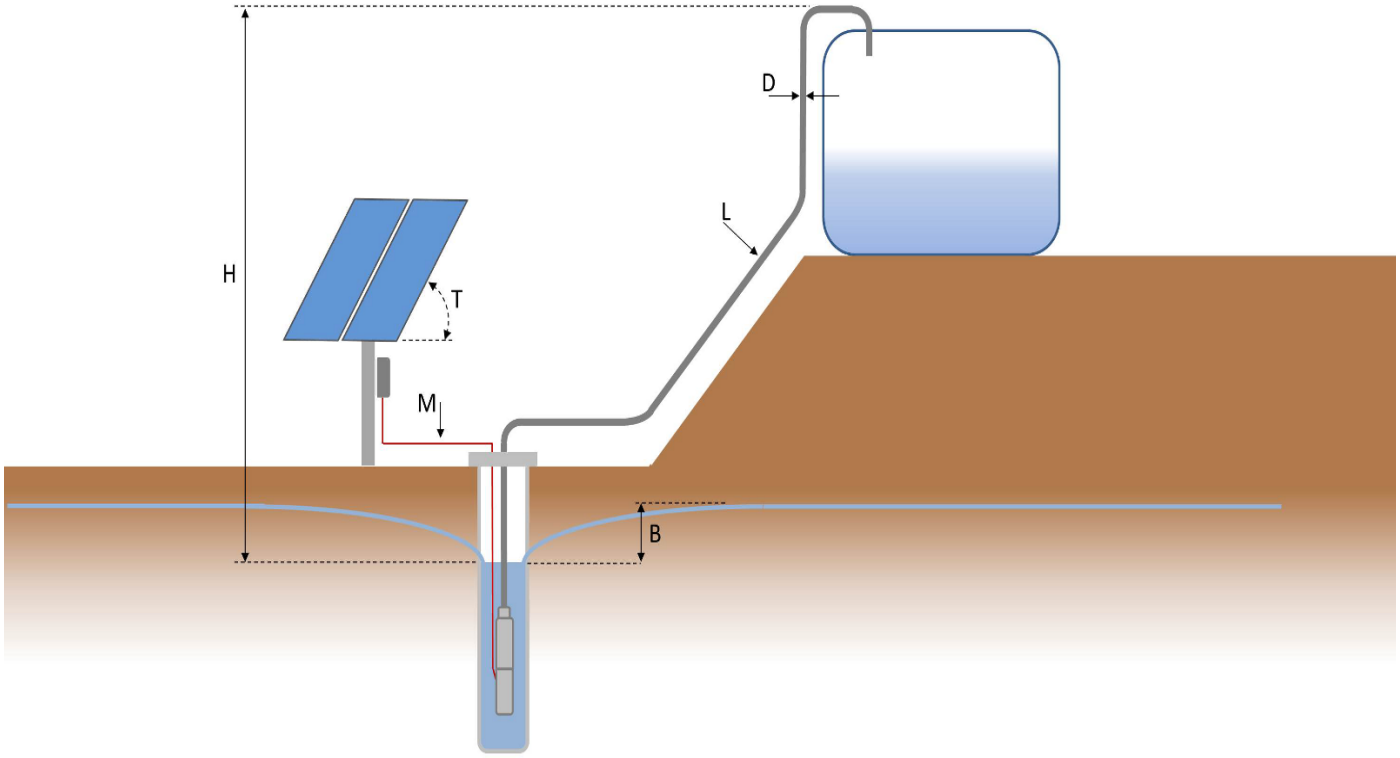
Solar pumping project

Sizing Layout



H (Static head):	Vertical height from the dynamic water level to the highest point of delivery.
B (Drawdown):	Lowering of water level depending on flow rate and recovery rate of the well.
D (Pipeline inner diameter)	
L (Pipe length):	Entire pipeline from the pump outlet to the point of delivery. Ellbows and armatures must be added as an equivalent length of pipeline.
M (Motor cable):	The cable between controller and pump unit.
T (Tilt angle):	Angle of the PV generator surface from the horizontal plane.

PS2-1800 HRE-23

Solar Submersible Pump System for 4" wells

System Overview

Head	max. 80 m
Flow rate	max. 3.9 m³/h

Technical Data

Controller PS2-1800

- Controlling and monitoring
- Control inputs for dry running protection, remote control etc.
- Protected against reverse polarity, overload and overtemperature
- Integrated MPPT (Maximum Power Point Tracking)
- Battery operation: Integrated low voltage disconnect
- Integrated Sun Sensor

Power	max. 1.8 kW
Input voltage	max. 200 V
Optimum Vmp**	> 102 V
Motor current	max. 14 A
Efficiency	max. 98 %
Ambient temp.	-40...50 °C
Enclosure class	IP68

Motor ECDRIVE 1800-HRE

- Maintenance-free brushless DC motor
- Water filled
- Premium materials, stainless steel: AISI 304/316
- No electronics in the motor

Rated power	1.7 kW
Efficiency	max. 92 %
Motor speed	900...3,300 rpm
Insulation class	F
Enclosure class	IP68
Submersion	max. 150 m

Pump End PE HRE-23***

- Non-return valve
- Premium materials, stainless steel: AISI 304/316
- Helical rotor pump

Efficiency	max. 67 %

Pump Unit PU1800 HRE-23 (Motor, Pump End)

Borehole diameter	min. 4,0 in
Water temperature	max. 50 °C

Standards

CE 2006/42/EC, 2004/108/EC, 2006/95/EC

IEC/EN 61702:1995, IEC/EN 62253 Ed.1

The logos shown reflect the approvals that have been granted for this product family. Products are ordered and supplied with the approvals specific to the market requirements.

**Vmp: MPP-voltage under Standard Test Conditions (STC): 1000 W/m² solar irradiance, 25 °C cell temperature

***Specify temperature range on order

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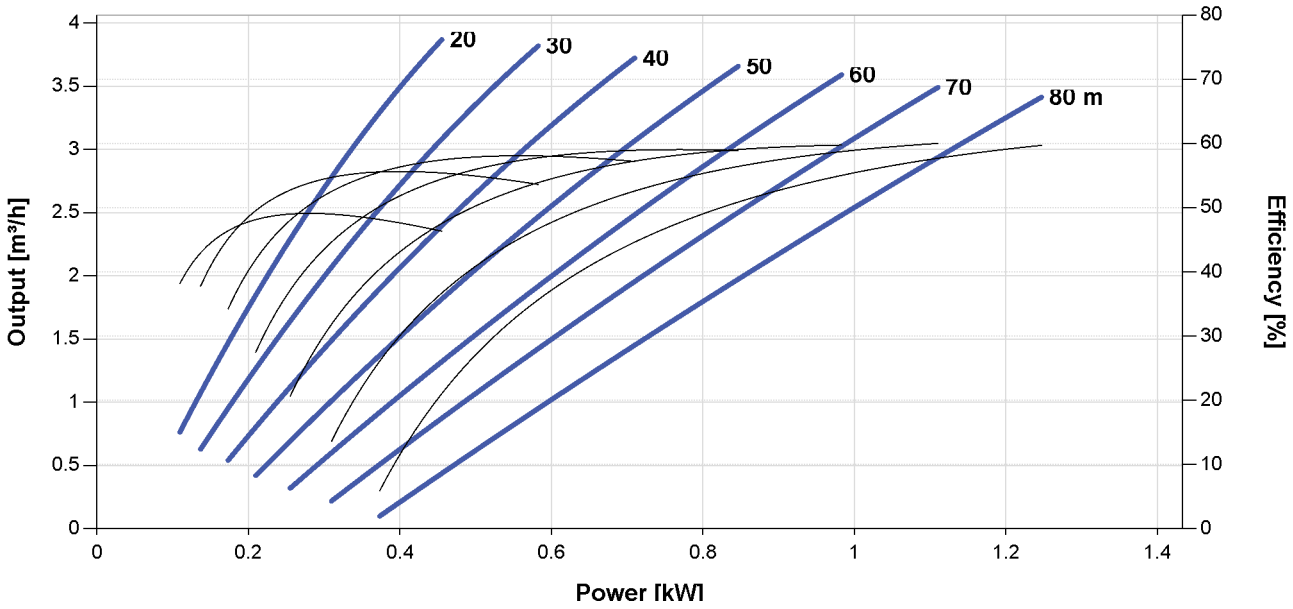
PS2-1800 HRE-23

Solar Submersible Pump System for 4" wells

Pump Chart

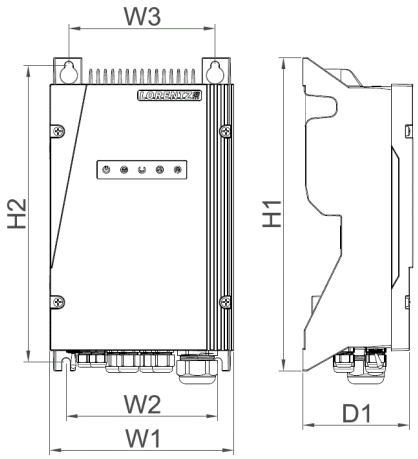
Vmp* > 102 V



Dimensions and Weights

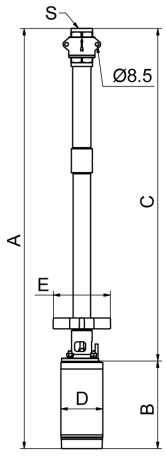
Controller

H1 = 352 mm
H2 = 333 mm
W1 = 207 mm
W2 = 170 mm
W3 = 164 mm
D1 = 124 mm



Pump Unit

A = 970 mm
B = 205 mm
C = 765 mm
D = 96 mm
E = 147 mm
S = 1.25 in



	Net weight
Controller	6.0 kg
Pump Unit	11 kg
Motor	6.8 kg
Pump End	4.5 kg

*Vmp: MPP-voltage under Standard Test Conditions (STC): 1000 W/m² solar irradiance, 25 °C cell temperature

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Well Probe V2

Mechanical float switch for dry run protection of LORENTZ solar pumps

The well probe provides a reliable method of run dry protection for LORENTZ pumps. The well probe detects that water is present within a well, tank or other water source. The well probe is typically attached to the riser pipe above the pump and connected to the controller. When the well probe becomes dry (water level is below the probe) the pump switches off to avoid dry running.

Order Information

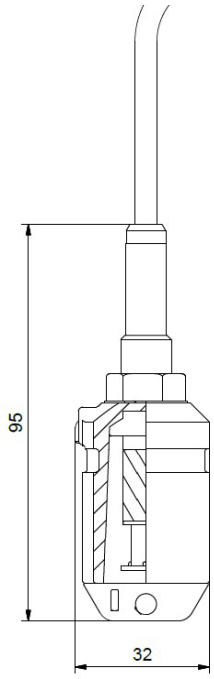
Item no.: 19-000005 **Product name:** Well probe sensor V2

Features

- Reliable dry run protection
- Simple to install using 3 cable ties
- Improved tolerance to dirt
- Splicing kit and cable ties for fixing are included

Technical Data

- Max. operating temperature 55°C
- Enclosure class: IP68
- Submersion depth: max 50 m (164 ft)
- Cable length: 1.5 m
- Wire size: 2 x 0.50 mm² or AWG 20, waterproofed
- Must be mounted in a vertical position
- Meets the requirements for CE



Dimensions / Weight

- Packaging dimensions: 255 x 170 x 40 mm
  10.0 x 6.7 x 1.6 in
- Total weight: 0.1 kg / 0.2 lbs

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V181107

WP Water Meter

The WP (Woltman) Water Meter is suitable for applications with a pipe size from DN50 to DN200.

Features

- Dry dial register ensures clear reading
- Low pressure loss, long working life
- Easy to install
- Reed switch output for easy water flow control and monitoring

Technical Data

- Water temperature 40°C
- Water pressure: max. 16 bar
- IP64
- CE Conformity

CE

Order information

item number	description
19-002165	water meter, WP-DN50, 0.1 cbm/p
19-002170	water meter, WP-DN65, 0.1 cbm/p
19-002180	water meter, WP-DN80, 0.1 cbm/p
19-002190	water meter, WP-DN100, 0.1 cbm/p
19-002200	water meter, WP-DN125, 0.1 cbm/p
19-002210	water meter, WP-DN150, 0.1 cbm/p
19-002202	water meter, WP-DN200, 0.1 cbm/p

Accuracy Curve

The Accuracy curve shows the deviation in percent for different flow rates. In regular operation the deviation is between -2% and +2%.

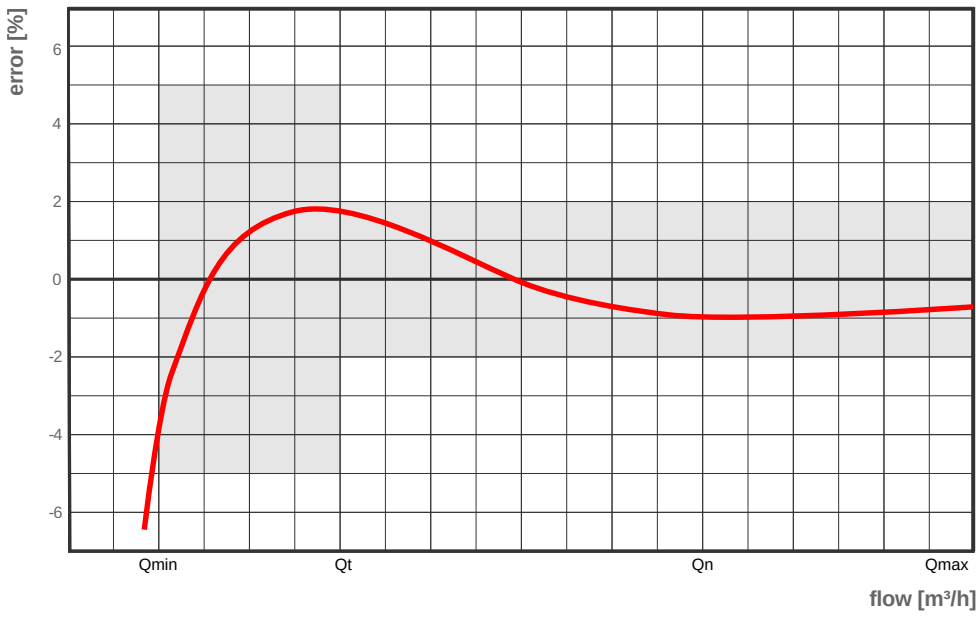
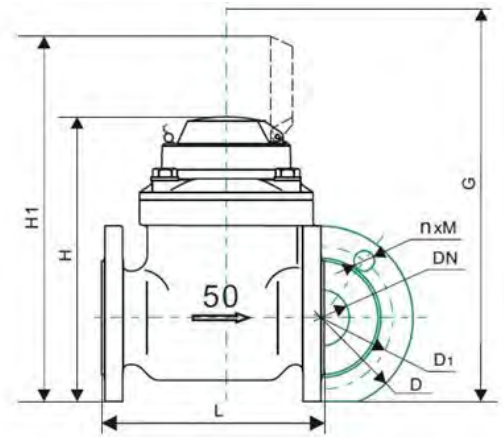


Table 1: WP - Flow rate characterisitics

	DN50	DN65	DN80	DN100	DN125	DN150	DN200
max. flow rate: Q_{max} [m³/h]	30	50	80	120	200	300	500
nominal flow rate: Q_n [m³/h]	15	25	40	60	100	150	250
transition flow rate: Q_t [m³/h]	3.0	5.0	8.0	12	20	30	50
minimum flow rate: Q_{min} [m³/h]	0.7	0.75	1.2	1.8	3.0	4.5	7.5

Table 2: WP - Dimensions, weight specifications

	DN50	DN65	DN80	DN100	DN125	DN150	DN200
L [mm]	200	200	225	250	250	300	350
H [mm]	232	242	252	262	275	325	355
H1 [mm]	303	313	323	333	346	396	426
G [mm]	360	360	360	360	360	420	420
D [mm]	165	185	200	220	250	285	340
D [mm]	125	145	160	180	210	240	295
Connecting bolt quantity	4xM16	4xM16	8xM16	8xM16	8xM16	8xM20	12xM20
Weight [kg]	12	13	16	18	20	42	74



About LORENTZ

LORENTZ is the global market leader in solar powered water pumping solutions. Founded in Germany during 1993 LORENTZ has pioneered, innovated and excelled in the engineering and manufacturing of solar powered water pumping. Today LORENTZ is active in over 130 countries through a dedicated network of professional partners. LORENTZ technology uses the power of the sun to pump water, sustaining and enhancing the life of millions of people, their livestock and crops.

Simply – ***Sun. Water. Life.***

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v210602

PV Disconnect 440-40-1

Connection box with DC disconnect

Description

An outdoor rated, combining connection box with DC disconnect switch that allows 1 strings of PV modules to be connected safely to a solar pump system.

The PV disconnect is also designed to accept an optional lightning protection device.

photo may differ from actual product

Features

- DC rated disconnect to provide safe isolation of the system
- Robust weather proof housing designed to make installation simple
- Lockable to secure the system during maintenance (power locked off)
- For professional installation of pumping systems
- Internal touch protection with screws
- Designed to be used with LORENTZ PS2-150 to PS2 4000 systems

Ordering and shipping information

- Item no: 19-000125
- Product name: PV Disconnect 440-40-1
- Packed volume 0.01 m^3 (0.35 ft^3)
- Packed weight 1.9 kg (4.2 lbs)

Technical data / Specifications

Maximum voltage	440 V DC	
Maximum current per string	40 A	
Maximum total current	40 A	
Number of strings.	1	
Input cables	4 - 10 mm^2	AWG 12 - 8
Output cables	4 - 10 mm^2	AWG 12 - 8
PG glands (input)	2 x M16	
PG glands (output)	2 x M16	
Lightening protection mounting hole	PG16 cap	
Environmental protection	IP68	NEMA6
Housing material	Polycarbonate	

Approvals and standards

- Switch IEC 60947-3

CE

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V210201

Optional lightning surge protector

Provides protection for the pump controller from incomming high voltages on the PV side. The surge protector connects through a pre-drilled and blanked mounting hole in the PV connect housing

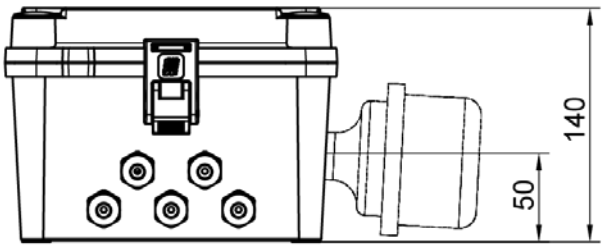
- Proper grounding of the device is required to achieve protection
- Item no.: 19-002120 MNSPD-115 PS2-150 to PS2-200
- Item no.: 19-002130 MNSPD-300 PS2-600 to PS2-1800
- Item no.: 19-002140 MNSPD-600 PS2-4000

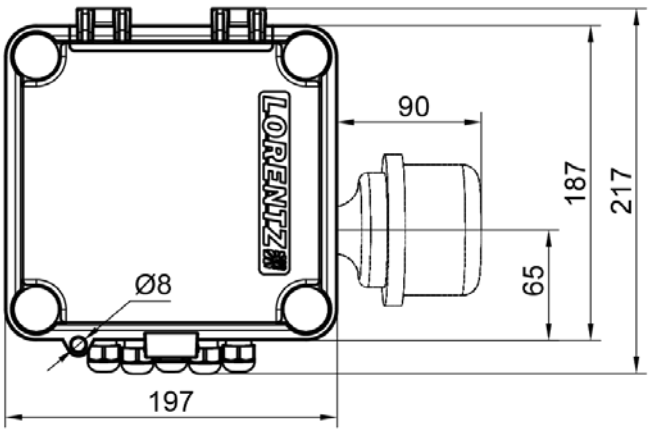
Mounting options

- Wall mount using 4 holes with weather protection
- Designed for optional pole mounting. Mounting points are pre-marked inside the housing.

Dimensions and weight

- See diagram for mm sizes
- Max height 220 mm (8.66")
- Max width (no surge protector) 197 mm (7.75")
- Max width (surge protector) 297 mm (Max 11.7")
- depth 140 mm (5.5")
- Weight 1403 g (3.1 lbs)





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PS2 Manual Speed Controller

Device to provide manual motor speed control of PS2 systems

The LORENTZ PS2 Manual Speed Controller allows adjustment of the maximum motor speed without using the PumpScanner App. To use the Manual Speed Controller, it is required to activate this function in the settings of PumpScanner during or before installation.

ORDER INFORMATION

- Item no.: 19-000035 Product name: PS2 Manual Speed Controller

FEATURES

- Allows manual control of PS2 motor speed
- Outdoor rated, installed in the housing of the controller

TECHNICAL DATA

- Voltage: 15-24 V DC
- Enclosure class: IP65
- Ambient temperature: -38…50 °C (-36… 122 F)
- Wire size: 2 x 0,75 mm²/18 AWG
- Replaces Ø 20mm cable gland
- Meets the requirements for CE
- Please note that if “Manual Speed Controller” is configured then “Set speed limitation” function is not available in PumpScanner.

DIMENSION/WEIGHT

- Packing dimension : 100 x 70 x 35 mm; 3.9 x 2.7 x 1.3 in
- Total weight: 0.2 kg / 0.4 lbs

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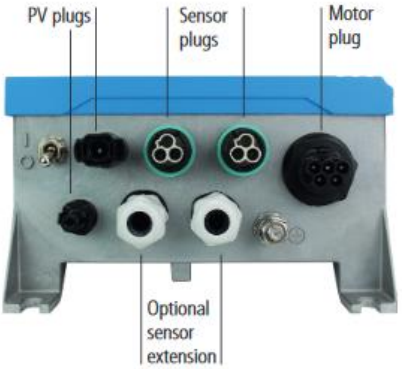
V180903

PS 2 Controller Plug Kit

Kit for an easy and electrical safe installation of PS2 Controller

The LORENTZ PS2 Controller Plug Kit can be installed on any PS2 system. The kit extends the internal wiring connections to plugs allowing systems to be pre-wired and delivered to site. Possible uses for the plug kit are where time on site needs to me minimized, where systems are often moved or where the skills available onsite do not allow for a standard installation.

The sensor extension kit allows the installation of two additional sensors, the standard set contains only two plug sets for sensor connections.



Order Information

- 19-005001 Plug- Kit PS2- Controller
- 19-005011 Sensor Plug Extension Kit

Features

- Allows fast, easy and electrical safe installation of PS2 Controller
- Customer must not open the controller for installation
- Outdoor rated, all parts are designed for outdoor use

Technical Data

PLUG	Wire size	max. current	max. voltage	Ambient temperature
Motor	max, 6mm² (10 AWG)	32 A	600V DC	-40°C … +90°C
PV	max 8mm² (8 AWG)	40 A (27A at 2.5mm² /14AWG)	1500V DC	-40°C …+90°C
Sensor	max. 1.5mm² (16 AWG)	3 A	50V DC	-40°C …+90°C

Packing Dimension/Weight

19-005001 Plug- Kit PS2- Controller

- Packing dimension: 16 x 300 x 4cm (6.3x12x1.6inch)
- Total weight: 0.33kg (0,73lb)

19-005011 Sensor Plug Extension Kit

- Packing dimension: 16 x 24 x 2cm (6.3x10x0.8inch)
- Total weight: 0.1kg (0,22lb)

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Surge Protector2

Device to Protect LORENTZ Pump Accessories from Voltage Spikes

ORDER INFORMATION

- **Item no.:** 19-005210 **product name:** Surge Protector2

FEATURES/COMPATIBILITY

- Reliable surge protection device for any switched, pulse or analogue (4-20 mA) inputs sensors including:
  - Well Probe Sensor 19-000000
  - Water Sensor 19-000001
  - Float Switch 19-000030
  - Pressure Switch 19-000310
  - Liquid Level (all types, e.g. 19-005040)
  - Liquid Pressure Sensor (all types, e.g. 19-004460)
  - Water Meter (all types, e.g. 19-002160)
  - Sun Switch (19-000050)
- The device must be installed inside the PS2 or PSk2 controller.

TECHNICAL DATA

- Max. voltage: 30 V DC
- Max current 8/20µs: 500 A
- Enclosure class: IP20
- Ambient temperature: max. 80°C (176°F)
- Wire size: 2 x 1.5mm² (AWG 16)
- Meets the requirements for CE

DIMENSION/WEIGHT

- Packing dimensions: 56 x 26 x 120 mm
  2.2 x 1.02 x 0.47 in
- Total weight 0.1 kg / 0.2 lbs

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V191120

LC310-P72

High-efficiency PV Module

Features

- high energy yields ensured by high conversion efficiency
- sturdy, clear-anodized aluminum frame with pre-drilled holes for quick installation
- advanced EVA encapsulation with triple-layer backsheet, meets the most stringent safety requirements for high-voltage operation
- pre-wired junction box equipped with connectors "plug'n'play"
- reliable bypass diodes to prevent overheating (hot spot effect) and to minimise power loss by shading
- manufactured in ISO 9001:2000-certified factory

photo may differ from actual product

Warranty

- Warranty: 2 years
- Performance guarantee:
  up to 10 years (90% power output)
  up to 20 years (80% power output)

  Details according to warranty issued by LORENTZ

Standards

LC310-P72 is certified according to IEC 61215 and 61730 by TÜV Rheinland and meets the requirements for CE.

TÜVRheinland CERTIFIED

IEC 61215
IEC 61730
Regular Production Surveillance

www.tuv.com
ID 1419063782

Specifications

Electrical Data

Peak power	Pmax	[Wp]	310
Tolerance		[%]	+5/0
Max. power current	Imp	[A]	8.25
Max. power voltage	Vmp	[V]	37.6
Short circuit current	Isc	[A]	8.84
Open circuit voltage	Voc	[V]	45.7
Temperature co-efficient for Pmax		[%/°C]	-0.42
Temperature co-efficient for Voc		[%/°C]	-0.34
Temperature co-efficient for Isc		[%/°C]	0.06
Max. system voltage		[VDC]	1,000
Module efficiency		[%]	15.97
Practical module efficiency		[%]	17.69

All technical data at standard test condition:
AM = 1.5, E = 1,000W/m², cell temperature: 25 °C

Cells

Number of cells in series	72
Number of cells in parallel	1
Cell technology	polycrystalline
Cell shape	rectangular

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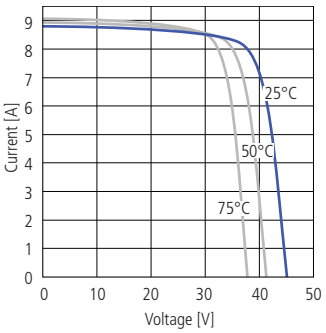
V180904

Electrical Performance

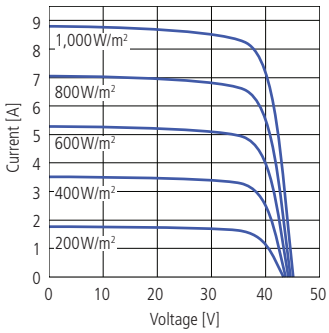
Electrical Performance

for different temperatures, at AM=1.5, E=1,000W/m²



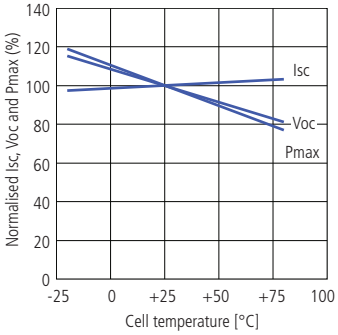
Electrical Performance

for different irradiation, at 25 °C



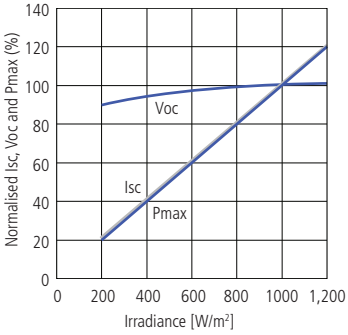
Temperature Dependence

of Isc, Voc and Pmax

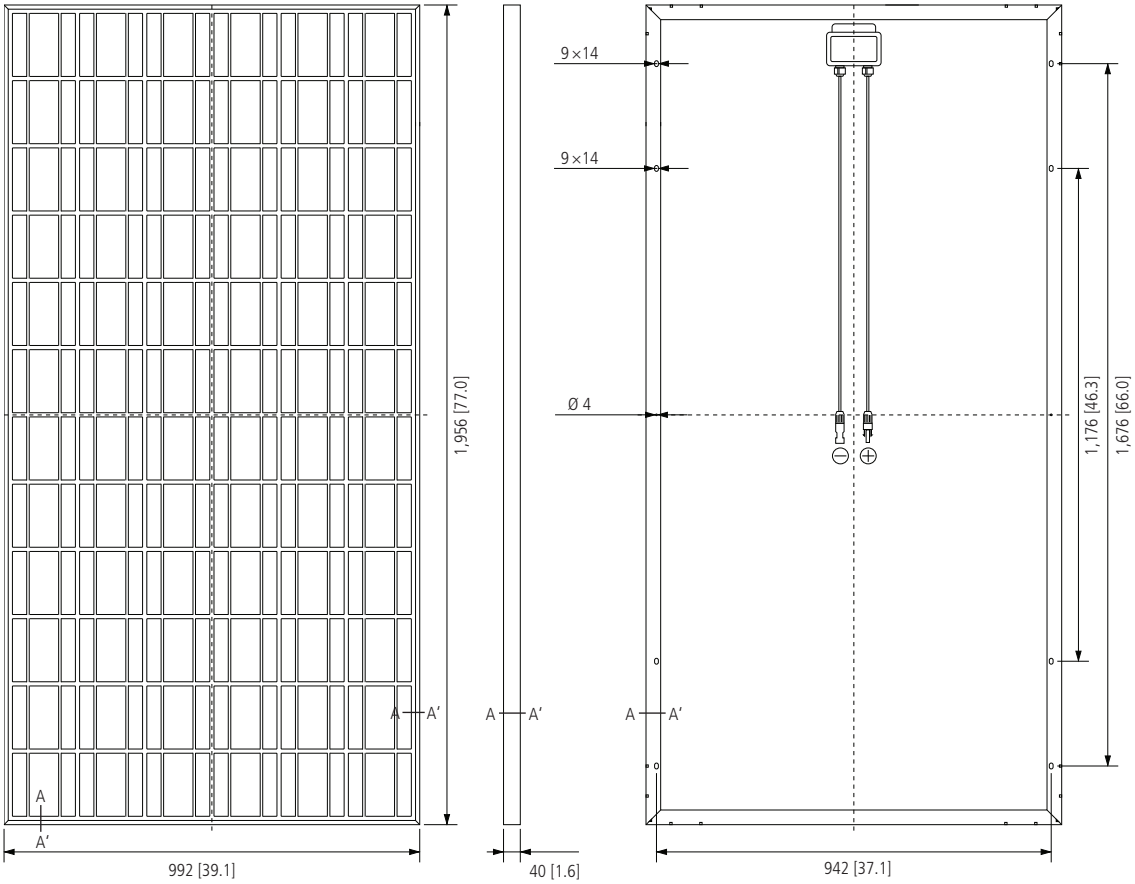


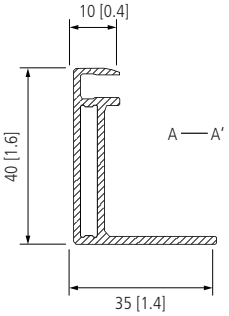
Irradiation Dependence

of Isc, Voc and Pmax at 25 °C



Physical Specifications mm





Weight	[kg]	22.0
Dimension	[mm]	1,956 × 992 × 40
Strength	[N/m²]	2,400
Cable		approx. 1200 mm, 4 mm²
Connectors		MC4 compatible

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V180904

GOAL Uganda

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P.O BOX 33140,Kampala (U)
http://www.goalglobal.org/countries/uganda

Friday, October 15, 2021

Mukorobi CTS- PV Sizing and Simulation

Solar pumping project

Parameter

Location:	Uganda, Jinja (0°; 33° East)	Water temperature:	25 °C		
Required daily output:	32 m³; Sizing for average month	Dirt loss:	5.0 %	Motor cable:	50 m
Pipe type:	steel, weldless, new neatly galvanized: 0.100 mm	Static head:	33 m	Pipe length:	39 m

Products

	Quantity	Details
PS2-1800 HRE-32-2	1 pc.	Submersible pump system including controller with DataModule, motor and pump end
LC300-P72	4 pc.	1,200 Wp; 4 x 1 modules; 15 ° tilted
Motor cable	50 m	6 mm² 3-phase cable for power and 1-phase cable for ground
Pipeline	39 m	50 mm (inner diameter) Pipeline
Accessories	1 set	Well Probe V2, Water Meter, PV Disconnect 440-40-1, Surge Protector2

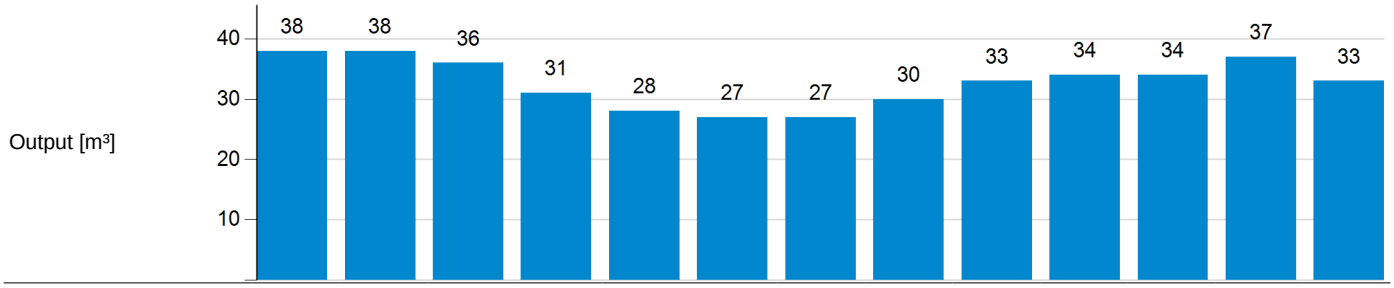
Sun Sensor setting in PumpScanner

min. 200 W/m²

Daily output in average month

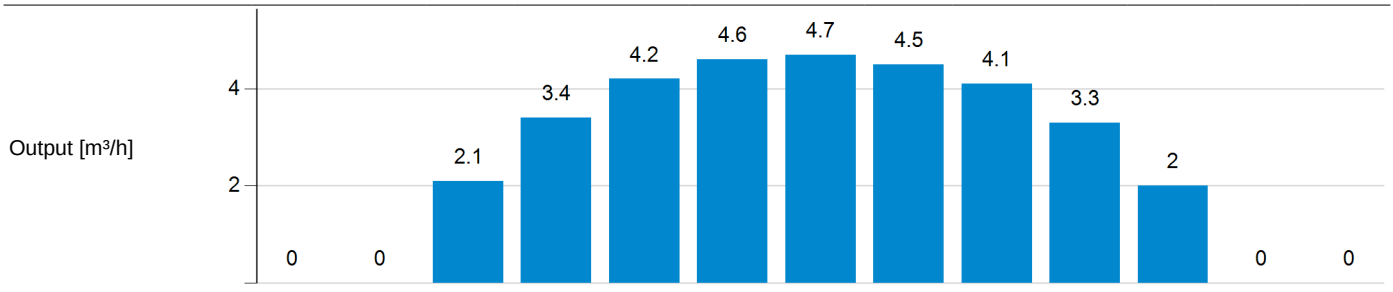
33 m³

Daily values



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Av.
Energy [kWh]	6.6	6.7	6.2	5.4	4.9	4.7	4.7	5.1	5.8	5.9	6.0	6.4	5.7
Irradiation [kWh/m²]	6.3	6.4	5.9	5.2	4.6	4.4	4.4	4.8	5.5	5.6	5.7	6.1	5.4
Rainfall [mm]	2.0	2.5	4.4	6.7	5.5	2.9	2.4	3.2	3.7	4.6	5.1	3.1	3.8
Ambient temp. [°C]	22	23	23	22	21	21	21	21	21	21	21	22	22

Hourly values



	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00
Energy [kWh]	0	0.17	0.37	0.54	0.67	0.74	0.76	0.73	0.66	0.53	0.36	0.17	0
Irradiation [kWh/m²]	0	0.15	0.33	0.50	0.63	0.71	0.74	0.71	0.63	0.50	0.33	0.15	0
Ambient temp. [°C]	17	17	18	20	22	24	26	27	27	27	27	26	26

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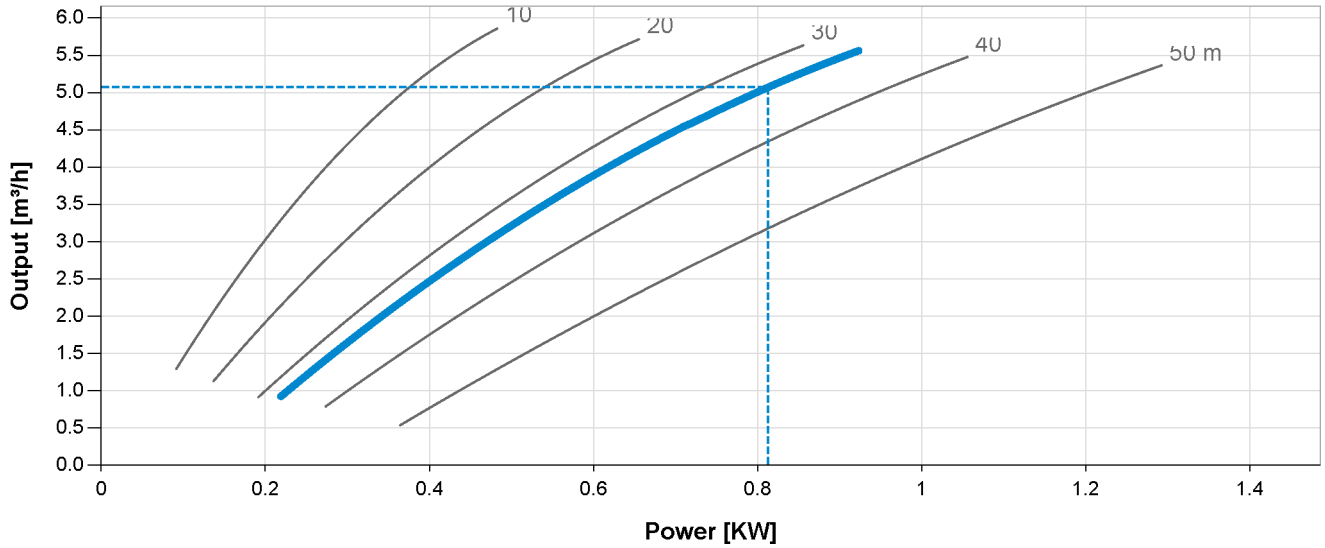
Mukorobi CTS- PV Sizing and Simulation

Solar pumping project

System characteristic



			Min.	800 W/m², 20 °C	Max./STC*
PV generator	Cell temperature	[°C]		46	25
	Temperature loss	[%]		8.8	-
	Dirt loss	[%]		5.0	-
	Pmax	[Wp]		832	1,200
	Vmp	[V]		133	146
	Imp	[A]		6.3	8
	Voc	[V]		164	180
	Isc	[A]		6.8	9
	Pout	[W]		832	-
	Vout	[V]		133	-
	Iout	[A]		6.3	-
Motor cable	Power loss	[%]	2.0	2.1	5.1
Pump systems	Motor power	[W]	219	813	923
	Motor voltage	[V EC]	35	107	117
	Motor current	[A]	6.3	7.6	7.9
	Motor speed	[rpm]	934	3,040	3,290
	Flow rate	[m³/h]	0.93	5.1	5.6
	Efficiency	[%]	36	56	57
Pipeline	Flow speed	[m/s]	0.13	0.72	0.79
	Friction loss	[m]	0.024	0.54	0.65

*STC: Standard test conditions for photovoltaic modules, 1000 W/m² solar irradiance, 25 °C cell temperature

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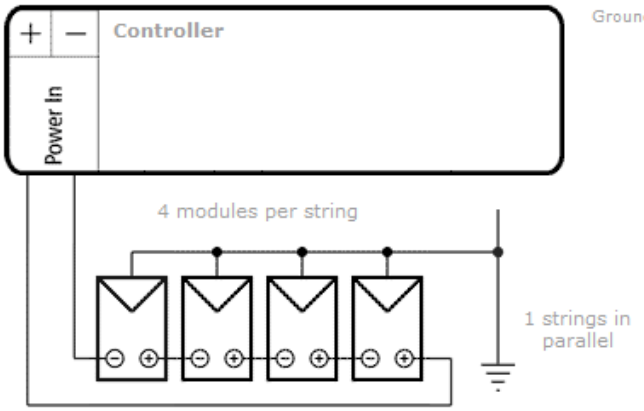
Solar pumping project

Wiring diagram



Grounding should be done according to the instructions of the module manufacturer.

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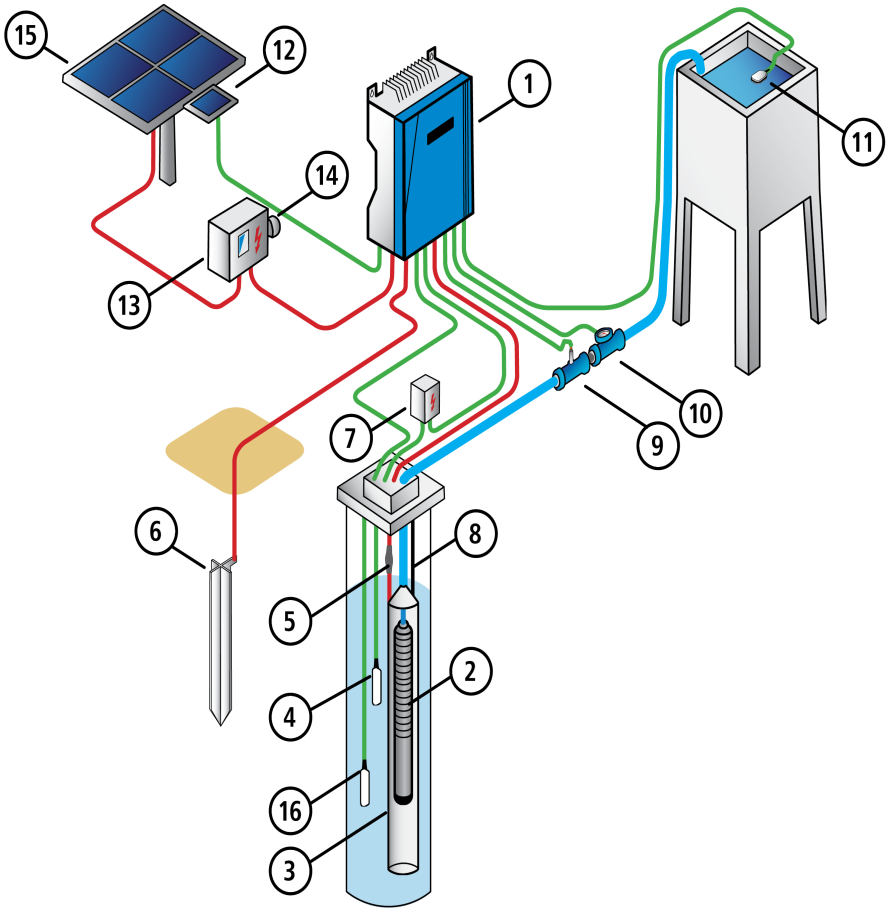
Mukorobi CTS- PV Sizing and Simulation

Solar pumping project

System Layout



1: PS2 Controller	**11:** Float Switch
2: Submersible Pump	**12:** Sun Switch
3: Flow Sleeve	**13:** PV Disconnect
4: Well Probe	**14:** Lightning Surge Protector
5: Cable Splice Kit	**15:** PV Generator
6: Grounding Rod	
7: Surge Protector*	
8: Safety Rope	
9: Water Meter	
10: Pressure Sensor	

*It is recommended to install a Surge Protector at each controller sensor input.

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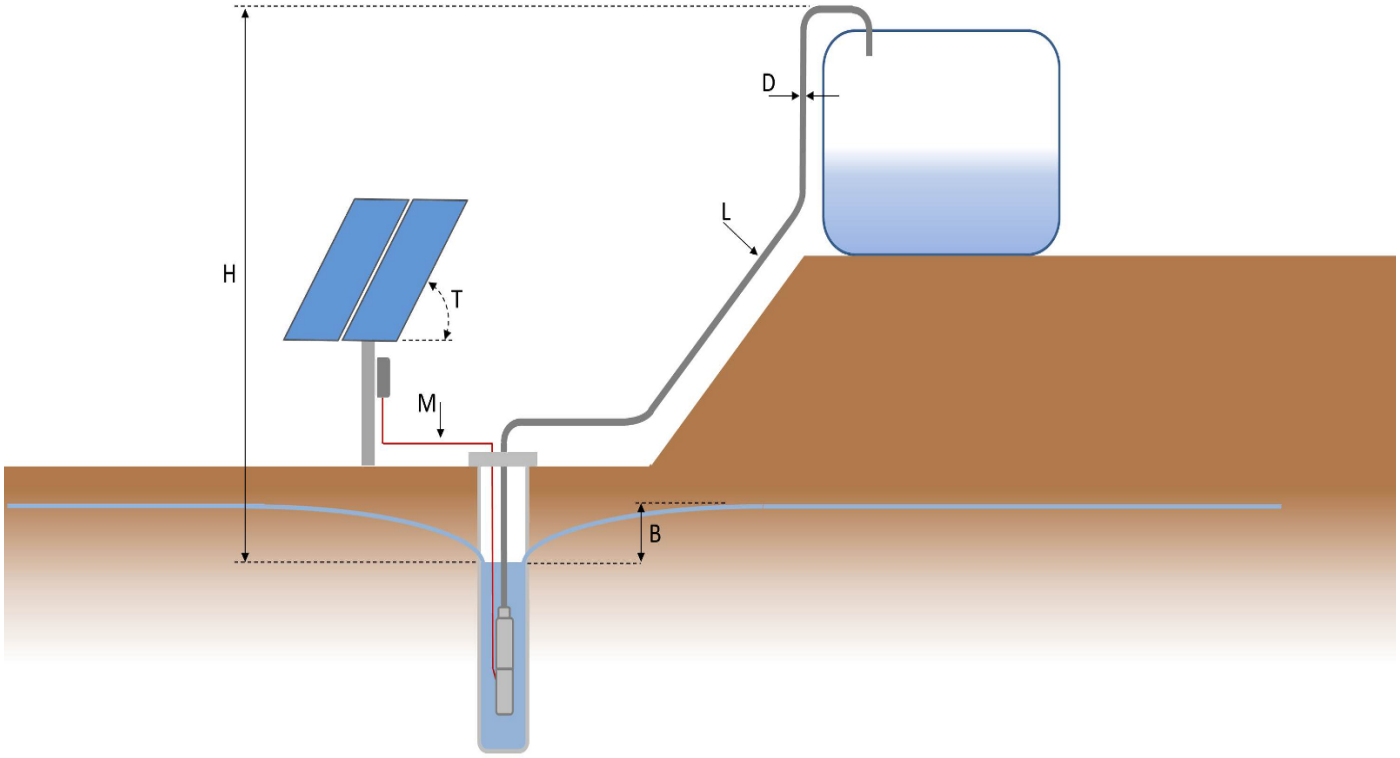
Mukorobi CTS- PV Sizing and Simulation

Solar pumping project

Sizing Layout



H (Static head):	Vertical height from the dynamic water level to the highest point of delivery.
B (Drawdown):	Lowering of water level depending on flow rate and recovery rate of the well.
D (Pipeline inner diameter)	
L (Pipe length):	Entire pipeline from the pump outlet to the point of delivery. Ellbows and armatures must be added as an equivalent length of pipeline.
M (Motor cable):	The cable between controller and pump unit.
T (Tilt angle):	Angle of the PV generator surface from the horizontal plane.

Well Probe V2

Mechanical float switch for dry run protection of LORENTZ solar pumps

The well probe provides a reliable method of run dry protection for LORENTZ pumps. The well probe detects that water is present within a well, tank or other water source. The well probe is typically attached to the riser pipe above the pump and connected to the controller. When the well probe becomes dry (water level is below the probe) the pump switches off to avoid dry running.

Order Information

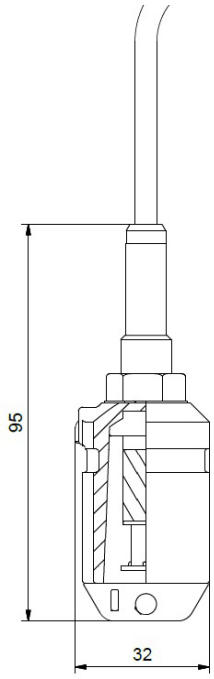
Item no.: 19-000005 **Product name:** Well probe sensor V2

Features

- Reliable dry run protection
- Simple to install using 3 cable ties
- Improved tolerance to dirt
- Splicing kit and cable ties for fixing are included

Technical Data

- Max. operating temperature 55°C
- Enclosure class: IP68
- Submersion depth: max 50 m (164 ft)
- Cable length: 1.5 m
- Wire size: 2 x 0.50 mm² or AWG 20, waterproofed
- Must be mounted in a vertical position
- Meets the requirements for CE



Dimensions / Weight

- Packaging dimensions: 255 x 170 x 40 mm
  10.0 x 6.7 x 1.6 in
- Total weight: 0.1 kg / 0.2 lbs

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V181107

WP Water Meter

The WP (Woltman) Water Meter is suitable for applications with a pipe size from DN50 to DN200.

Features

- Dry dial register ensures clear reading
- Low pressure loss, long working life
- Easy to install
- Reed switch output for easy water flow control and monitoring

Technical Data

- Water temperature 40°C
- Water pressure: max. 16 bar
- IP64
- CE Conformity

CE

Order information

item number	description
19-002165	water meter, WP-DN50, 0.1 cbm/p
19-002170	water meter, WP-DN65, 0.1 cbm/p
19-002180	water meter, WP-DN80, 0.1 cbm/p
19-002190	water meter, WP-DN100, 0.1 cbm/p
19-002200	water meter, WP-DN125, 0.1 cbm/p
19-002210	water meter, WP-DN150, 0.1 cbm/p
19-002202	water meter, WP-DN200, 0.1 cbm/p

Accuracy Curve

The Accuracy curve shows the deviation in percent for different flow rates. In regular operation the deviation is between -2% and +2%.

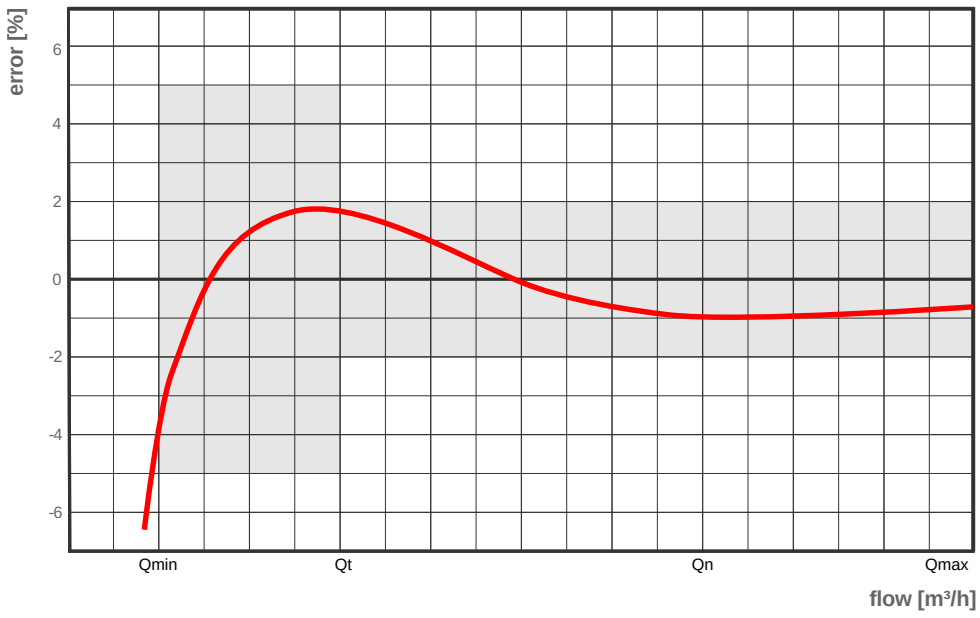
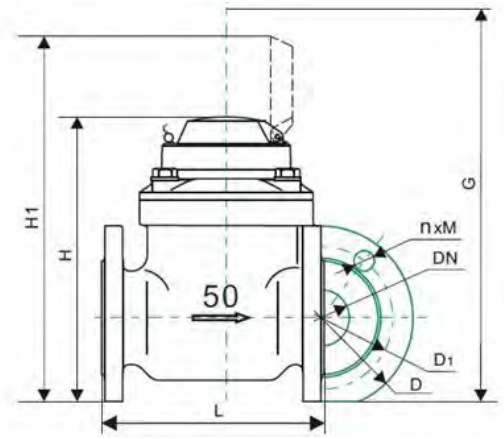


Table 1: WP - Flow rate characterisitics

	DN50	DN65	DN80	DN100	DN125	DN150	DN200
max. flow rate: Q_{max} [m³/h]	30	50	80	120	200	300	500
nominal flow rate: Q_n [m³/h]	15	25	40	60	100	150	250
transition flow rate: Q_t [m³/h]	3.0	5.0	8.0	12	20	30	50
minimum flow rate: Q_{min} [m³/h]	0.7	0.75	1.2	1.8	3.0	4.5	7.5

Table 2: WP - Dimensions, weight specifications

	DN50	DN65	DN80	DN100	DN125	DN150	DN200
L [mm]	200	200	225	250	250	300	350
H [mm]	232	242	252	262	275	325	355
H1 [mm]	303	313	323	333	346	396	426
G [mm]	360	360	360	360	360	420	420
D [mm]	165	185	200	220	250	285	340
D [mm]	125	145	160	180	210	240	295
Connecting bolt quantity	4xM16	4xM16	8xM16	8xM16	8xM16	8xM20	12xM20
Weight [kg]	12	13	16	18	20	42	74



About LORENTZ

LORENTZ is the global market leader in solar powered water pumping solutions. Founded in Germany during 1993 LORENTZ has pioneered, innovated and excelled in the engineering and manufacturing of solar powered water pumping. Today LORENTZ is active in over 130 countries through a dedicated network of professional partners. LORENTZ technology uses the power of the sun to pump water, sustaining and enhancing the life of millions of people, their livestock and crops.

Simply – ***Sun. Water. Life.***

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v210602

PV Disconnect 440-40-1

Connection box with DC disconnect

Description

An outdoor rated, combining connection box with DC disconnect switch that allows 1 strings of PV modules to be connected safely to a solar pump system.

The PV disconnect is also designed to accept an optional lightning protection device.

photo may differ from actual product

Features

- DC rated disconnect to provide safe isolation of the system
- Robust weather proof housing designed to make installation simple
- Lockable to secure the system during maintenance (power locked off)
- For professional installation of pumping systems
- Internal touch protection with screws
- Designed to be used with LORENTZ PS2-150 to PS2 4000 systems

Ordering and shipping information

- Item no: 19-000125
- Product name: PV Disconnect 440-40-1
- Packed volume 0.01 m^3 (0.35 ft^3)
- Packed weight 1.9 kg (4.2 lbs)

Technical data / Specifications

Maximum voltage	440 V DC	
Maximum current per string	40 A	
Maximum total current	40 A	
Number of strings.	1	
Input cables	4 - 10 mm^2	AWG 12 - 8
Output cables	4 - 10 mm^2	AWG 12 - 8
PG glands (input)	2 x M16	
PG glands (output)	2 x M16	
Lightening protection mounting hole	PG16 cap	
Environmental protection	IP68	NEMA6
Housing material	Polycarbonate	

Approvals and standards

- Switch IEC 60947-3

CE

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V210201

Optional lightning surge protector

Provides protection for the pump controller from incomming high voltages on the PV side. The surge protector connects through a pre-drilled and blanked mounting hole in the PV connect housing

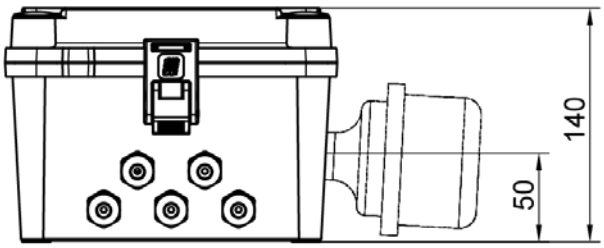
- Proper grounding of the device is required to achieve protection
- Item no.: 19-002120 MNSPD-115 PS2-150 to PS2-200
- Item no.: 19-002130 MNSPD-300 PS2-600 to PS2-1800
- Item no.: 19-002140 MNSPD-600 PS2-4000

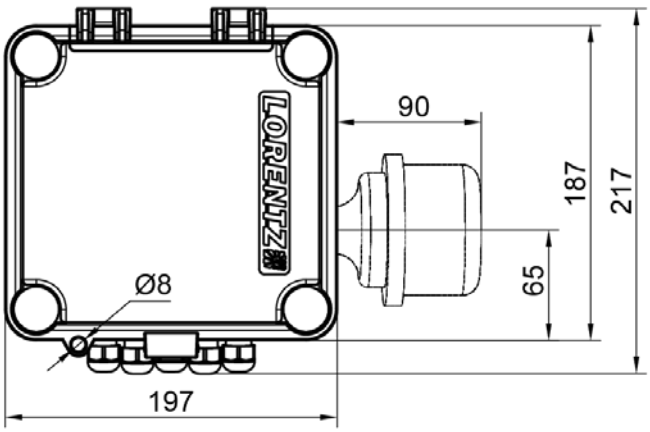
Mounting options

- Wall mount using 4 holes with weather protection
- Designed for optional pole mounting. Mounting points are pre-marked inside the housing.

Dimensions and weight

- See diagram for mm sizes
- Max height 220 mm (8.66")
- Max width (no surge protector) 197 mm (7.75")
- Max width (surge protector) 297 mm (Max 11.7")
- depth 140 mm (5.5")
- Weight 1403 g (3.1 lbs)





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Surge Protector2

Device to Protect LORENTZ Pump Accessories from Voltage Spikes

ORDER INFORMATION

- **Item no.:** 19-005210 **product name:** Surge Protector2

FEATURES/COMPATIBILITY

- Reliable surge protection device for any switched, pulse or analogue (4-20 mA) inputs sensors including:
  - Well Probe Sensor 19-000000
  - Water Sensor 19-000001
  - Float Switch 19-000030
  - Pressure Switch 19-000310
  - Liquid Level (all types, e.g. 19-005040)
  - Liquid Pressure Sensor (all types, e.g. 19-004460)
  - Water Meter (all types, e.g. 19-002160)
  - Sun Switch (19-000050)
- The device must be installed inside the PS2 or PSk2 controller.

TECHNICAL DATA

- Max. voltage: 30 V DC
- Max current 8/20µs: 500 A
- Enclosure class: IP20
- Ambient temperature: max. 80°C (176°F)
- Wire size: 2 x 1.5mm² (AWG 16)
- Meets the requirements for CE

DIMENSION/WEIGHT

- Packing dimensions: 56 x 26 x 120 mm
  2.2 x 1.02 x 0.47 in
- Total weight 0.1 kg / 0.2 lbs

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V191120

PS2-1800 HRE-32

Solar Submersible Pump System for 4" wells

System Overview

Head	max. 50 m
Flow rate	max. 5.9 m³/h

Technical Data

Controller PS2-1800

- Controlling and monitoring
- Control inputs for dry running protection, remote control etc.
- Protected against reverse polarity, overload and overtemperature
- Integrated MPPT (Maximum Power Point Tracking)
- Battery operation: Integrated low voltage disconnect
- Integrated Sun Sensor

Power	max. 1.8 kW
Input voltage	max. 200 V
Optimum Vmp**	> 102 V
Motor current	max. 14 A
Efficiency	max. 98 %
Ambient temp.	-40...50 °C
Enclosure class	IP68

Motor ECDRIVE 1800-HRE

- Incl. 15m of 3x 2, 5 mm² plugged motor cable
- Maintenance-free brushless DC motor
- Premium materials, stainless steel: AISI 304/316
- No electronics in the motor

Rated power	1.7 kW
Efficiency	max. 92 %
Motor speed	900...3,300 rpm
Insulation class	F
Enclosure class	IP68
Submersion	max. 150 m

Pump End PE HRE-32***

- Non-return valve
- Premium materials, stainless steel: AISI 304/316
- Helical rotor pump

Efficiency	max. 65 %

Pump Unit PU1800 HRE-32 (Motor, Pump End)

Borehole diameter	min. 4,0 in
Water temperature	max. 50 °C

Standards

CE 2006/42/EC, 2004/108/EC, 2006/95/EC

IEC/EN 61702:1995, IEC/EN 62253 Ed.1

The logos shown reflect the approvals that have been granted for this product family. Products are ordered and supplied with the approvals specific to the market requirements.

**Vmp: MPP-voltage under Standard Test Conditions (STC): 1000 W/m² solar irradiance, 25 °C cell temperature

***Specify temperature range on order

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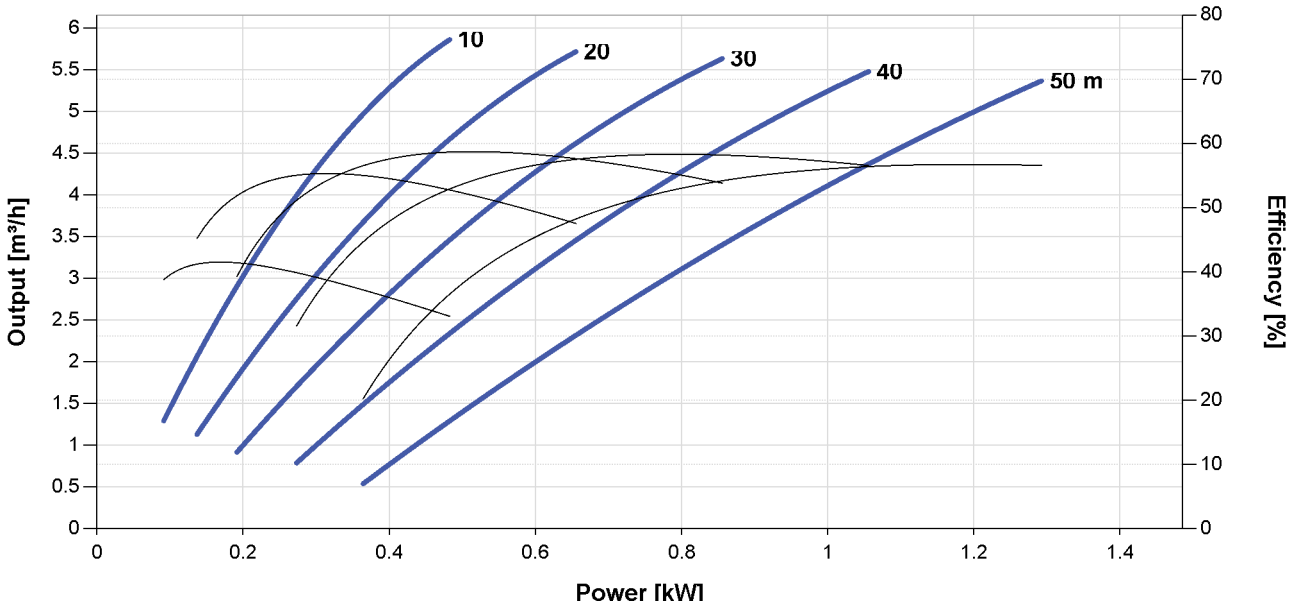
PS2-1800 HRE-32

Solar Submersible Pump System for 4" wells

Pump Chart

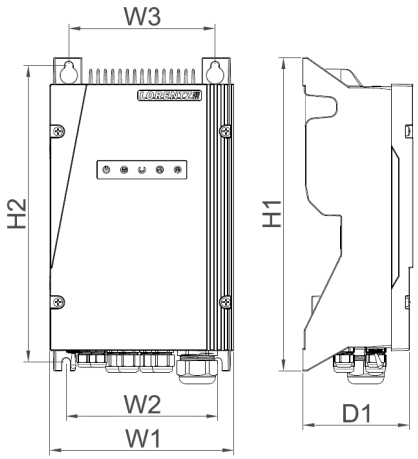
Vmp* > 102 V



Dimensions and Weights

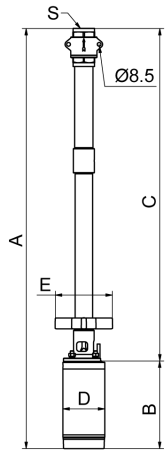
Controller

H1 = 352 mm
H2 = 333 mm
W1 = 207 mm
W2 = 170 mm
W3 = 164 mm
D1 = 124 mm



Pump Unit

A = 1,030 mm
B = 205 mm
C = 825 mm
D = 96 mm
E = 147 mm
S = 1.5 in



	Net weight
Controller	6.0 kg
Pump Unit	12 kg
Motor	6.8 kg
Pump End	5.5 kg

*Vmp: MPP-voltage under Standard Test Conditions (STC): 1000 W/m² solar irradiance, 25 °C cell temperature

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PS2 Manual Speed Controller

Device to provide manual motor speed control of PS2 systems

The LORENTZ PS2 Manual Speed Controller allows adjustment of the maximum motor speed without using the PumpScanner App. To use the Manual Speed Controller, it is required to activate this function in the settings of PumpScanner during or before installation.

ORDER INFORMATION

- Item no.: 19-000035 Product name: PS2 Manual Speed Controller

FEATURES

- Allows manual control of PS2 motor speed
- Outdoor rated, installed in the housing of the controller

TECHNICAL DATA

- Voltage: 15-24 V DC
- Enclosure class: IP65
- Ambient temperature: -38…50 °C (-36… 122 F)
- Wire size: 2 x 0,75 mm²/18 AWG
- Replaces Ø 20mm cable gland
- Meets the requirements for CE
- Please note that if “Manual Speed Controller” is configured then “Set speed limitation” function is not available in PumpScanner.

DIMENSION/WEIGHT

- Packing dimension : 100 x 70 x 35 mm; 3.9 x 2.7 x 1.3 in
- Total weight: 0.2 kg / 0.4 lbs

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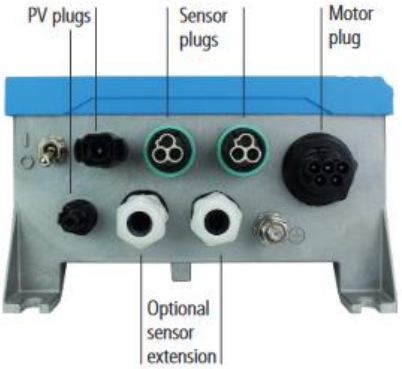
V180903

PS 2 Controller Plug Kit

Kit for an easy and electrical safe installation of PS2 Controller

The LORENTZ PS2 Controller Plug Kit can be installed on any PS2 system. The kit extends the internal wiring connections to plugs allowing systems to be pre-wired and delivered to site. Possible uses for the plug kit are where time on site needs to me minimized, where systems are often moved or where the skills available onsite do not allow for a standard installation.

The sensor extension kit allows the installation of two additional sensors, the standard set contains only two plug sets for sensor connections.



Order Information

- 19-005001 Plug- Kit PS2- Controller
- 19-005011 Sensor Plug Extension Kit

Features

- Allows fast, easy and electrical safe installation of PS2 Controller
- Customer must not open the controller for installation
- Outdoor rated, all parts are designed for outdoor use

Technical Data

PLUG	Wire size	max. current	max. voltage	Ambient temperature
Motor	max, 6mm² (10 AWG)	32 A	600V DC	-40°C … +90°C
PV	max 8mm² (8 AWG)	40 A (27A at 2.5mm² /14AWG)	1500V DC	-40°C …+90°C
Sensor	max. 1.5mm² (16 AWG)	3 A	50V DC	-40°C …+90°C

Packing Dimension/Weight

19-005001 Plug- Kit PS2- Controller

- Packing dimension: 16 x 300 x 4cm (6.3x12x1.6inch)
- Total weight: 0.33kg (0,73lb)

19-005011 Sensor Plug Extension Kit

- Packing dimension: 16 x 24 x 2cm (6.3x10x0.8inch)
- Total weight: 0.1kg (0,22lb)

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LC300-P72

High-efficiency PV Module

Features

- high energy yields ensured by high conversion efficiency
- sturdy, clear-anodized aluminum frame with pre-drilled holes for quick installation
- advanced EVA encapsulation with triple-layer backsheet, meets the most stringent safety requirements for high-voltage operation
- pre-wired junction box equipped with connectors "plug'n'play"
- reliable bypass diodes to prevent overheating (hot spot effect) and to minimise power loss by shading
- manufactured in ISO 9001:2000-certified factory

photo may differ from actual product

Warranty

- Warranty: 2 years
- Performance guarantee:
  up to 10 years (90% power output)
  up to 20 years (80% power output)

  Details according to warranty issued by LORENTZ

Standards

LC300-P72 is certified according to IEC 61215 and 61730 by TÜV Rheinland and meets the requirements for CE.

TÜVRheinland CERTIFIED

IEC 61215
IEC 61730
Regular Production Surveillance

www.tuv.com
ID 1419063782

CE

Specifications

Electrical Data

Peak power	Pmax	[Wp]	300
Tolerance		[%]	+5/0
Max. power current	Imp	[A]	8.21
Max. power voltage	Vmp	[V]	36.5
Short circuit current	Isc	[A]	8.8
Open circuit voltage	Voc	[V]	45.1
Temperature co-efficient for Pmax		[%/°C]	-0.42
Temperature co-efficient for Voc		[%/°C]	-0.34
Temperature co-efficient for Isc		[%/°C]	0.06
Max. system voltage		[VDC]	1,000
Module efficiency		[%]	15.46
Practical module efficiency		[%]	17.12

All technical data at standard test condition:
AM = 1.5, E = 1,000W/m², cell temperature: 25 °C

Cells

Number of cells in series	72
Number of cells in parallel	1
Cell technology	polycrystalline
Cell shape	rectangular

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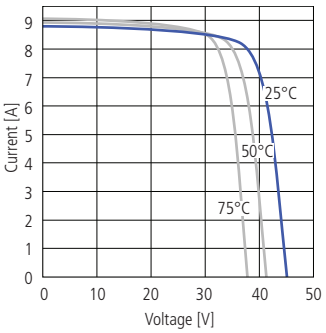
V181203

Electrical Performance

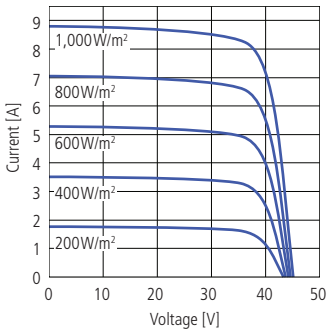
Electrical Performance

for different temperatures, at AM=1.5, E=1,000W/m²



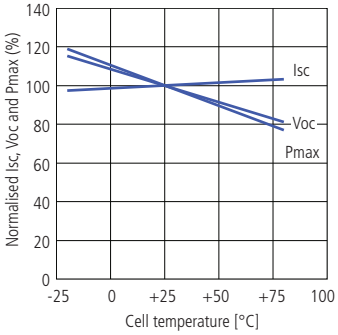
Electrical Performance

for different irradiation, at 25 °C



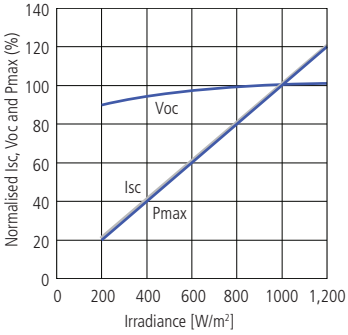
Temperature Dependence

of Isc, Voc and Pmax

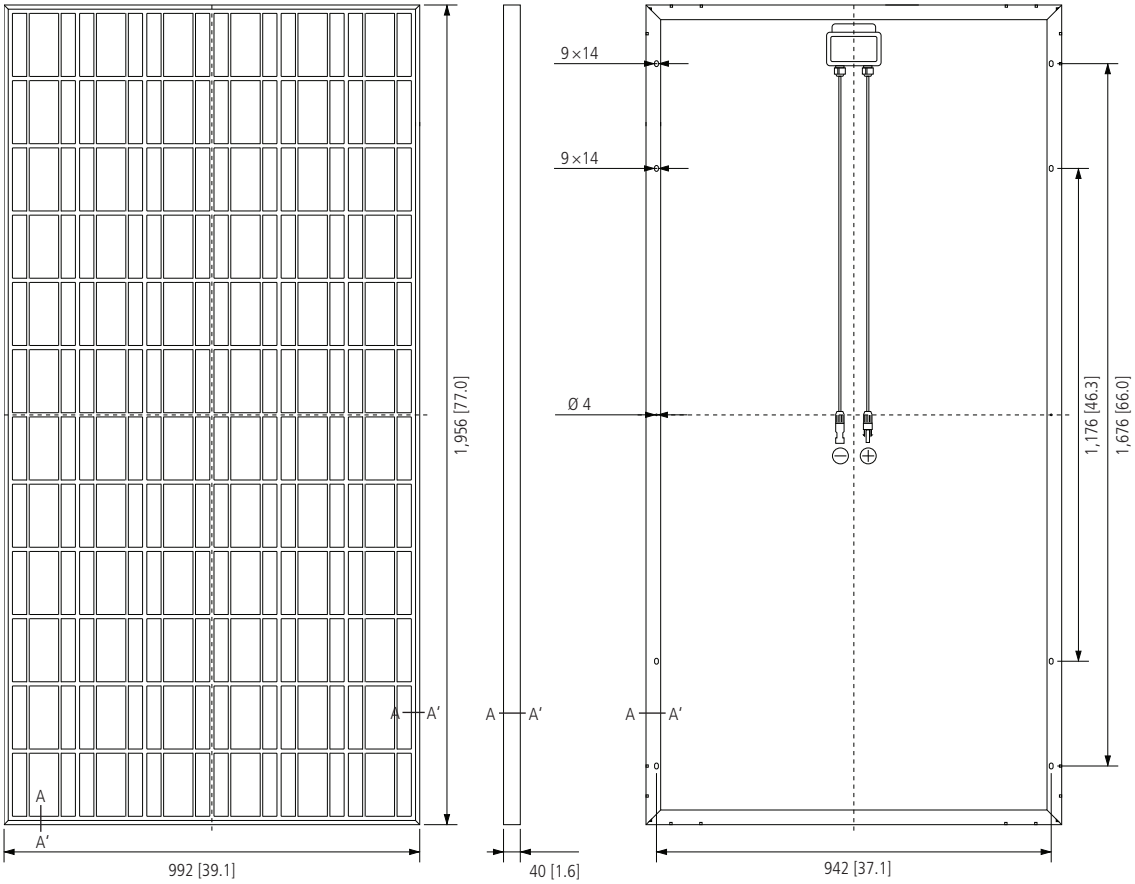


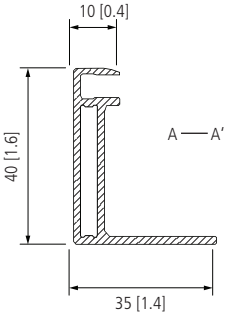
Irradiation Dependence

of Isc, Voc and Pmax at 25 °C



Physical Specifications mm





Weight	[kg]	21.8
Dimension	[mm]	1,956 × 992 × 40
Strength	[N/m²]	2,400
Cable		approx. 900 mm, 4 mm²
Connectors		MC4 PV-KBT4/6II-UR / PV-KST4/6II-UR

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