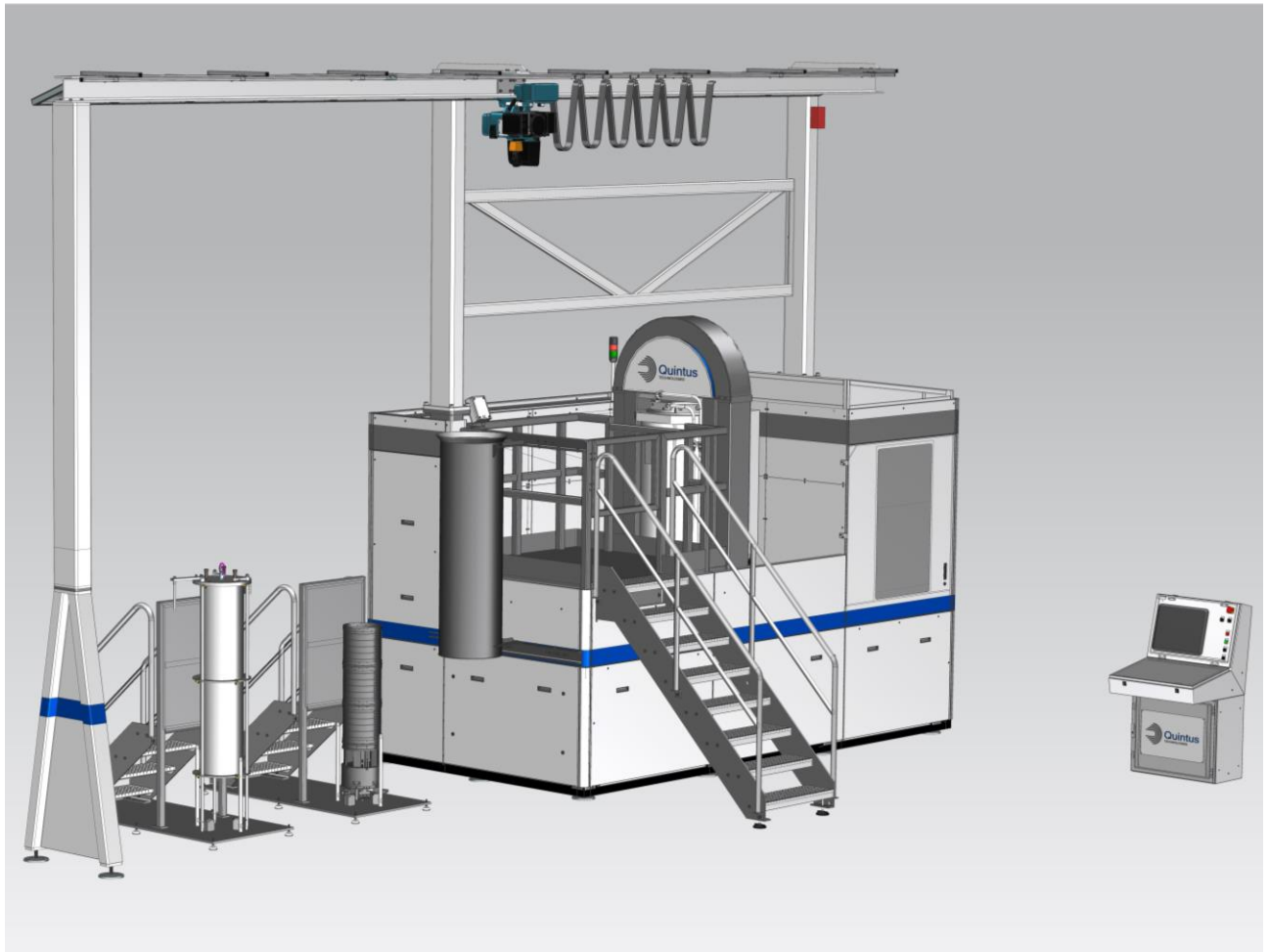


QUINTUS[®] Hot Isostatic Press QIH 32

Product Data Sheet

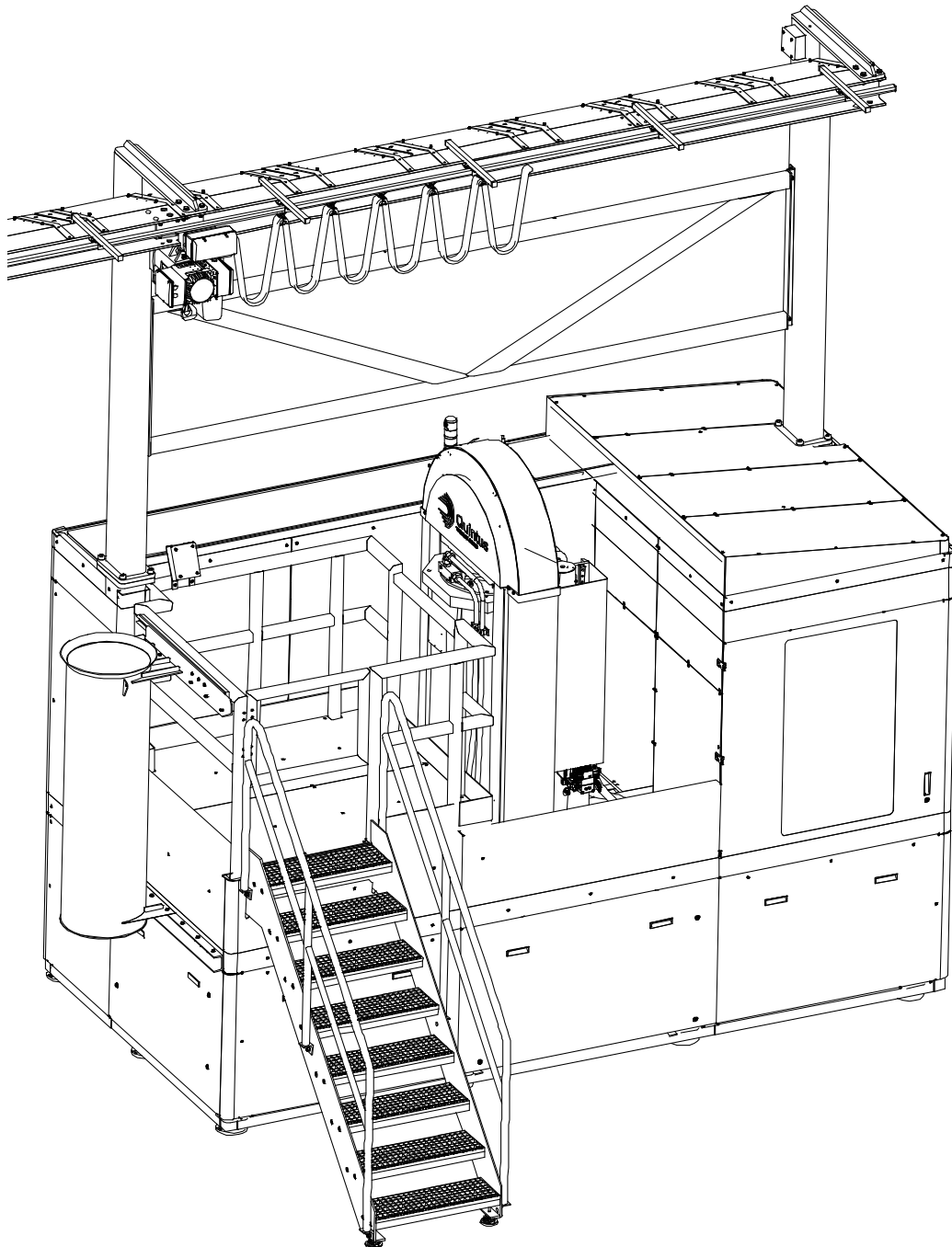


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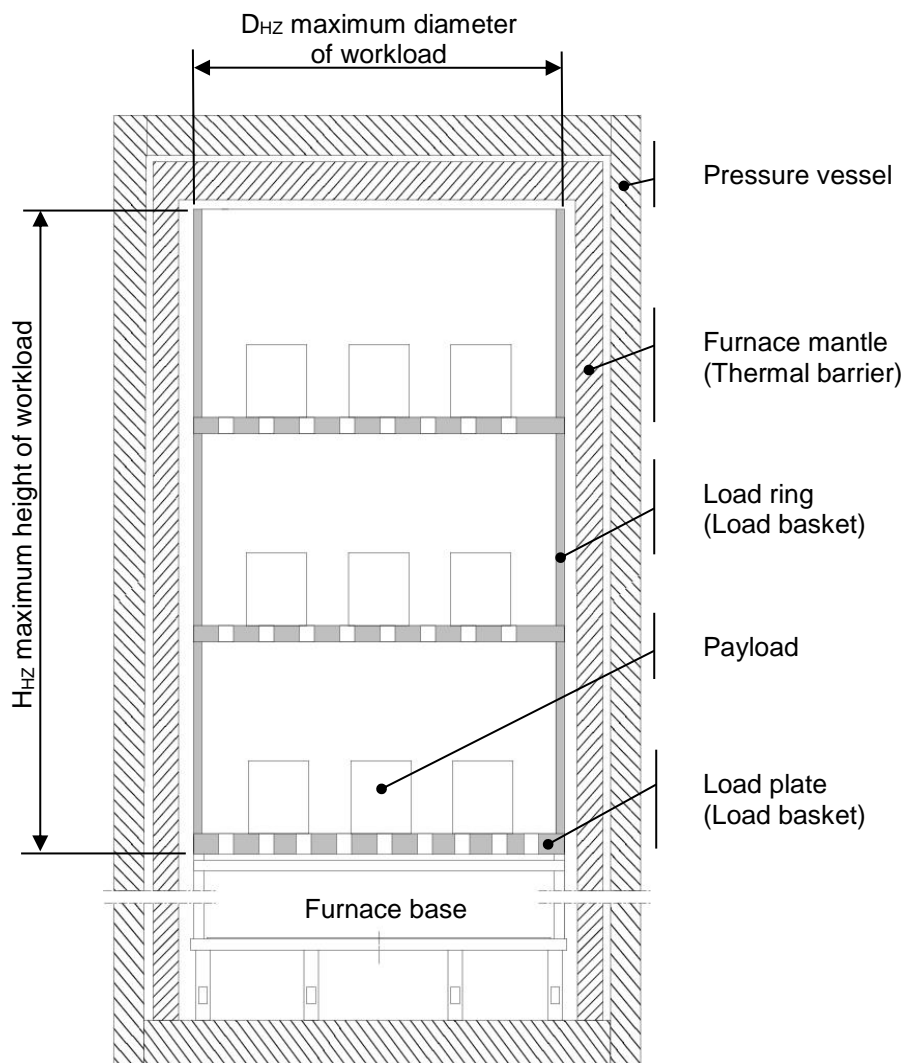
Pressure vessel

Max. operating pressure:	207 MPa
Design pressure:	228 MPa
Pressure vessel volume:	242 dm ³
Total weight of complete unit, approximately:	22 000 kg



Furnace

Hot zone definition



Molybdenum furnace 1400M URC®*

Maximum operating temperature:	1 400 °C
Maximum height of workload, H _{HZ} :	890 mm
Maximum diameter of workload, D _{HZ} :	300 mm
Maximum weight of workload (incl. weight of load basket):	350 kg
Maximum temperature deviation at steady state measured in the gas within the workload volume, at temperatures between 500 °C and maximum temperature and pressures above 20 MPa using workload TC control:	± 8 °C
Number of heating zones:	3 pcs
Number of furnace thermocouples per heating zone, type B:	2 pcs
Number of plug-in for workload thermocouples, type B:	6 pcs
Nominal installed furnace power, approximately:	128 kVA

* The Molybdenum furnace is considered a wear part.
 The deterioration of Molybdenum increases with increasing operating temperature.

Estimated cycle time for Molybdenum furnace 1400M URC®

Calculated cycle to 1200 °C, 150 MPa with a total workload of 130 kg and sustain time of 3 hours.
 The workload weight consist of load basket and payload (limited to 15 parts).
 The calculation is based on that the payload and load baskets have the same thermal mass as steel.
 A minimum of 15 % free gas flow area through the workload is required for the URC® cycle.

Cycle step	URC	URC* without payload	Natural cool
Vacuum pumping / flushing 2 times, less than 5 mbar	24	25	24
Equalizing	18	20	18
Pumping and heating	66	40	66
Sustain / hold	180	180	180
Cooling to 200 °C	25	14	210
Equalizing reclaim of gas	18	20	18
Recovery pumping to 4 MPa	31	34	31
Exhaust	20	22	20
Total [min] incl. sustain/hold time	382	355	567
Total [h] incl. sustain/hold time	6,4	5,9	9,5

* No payload, only one load plate and one cylinder for gas flow guiding.

Calculated consumption for the estimated cycle (URC) above:

Gas consumption per cycle, approximately:	7 Nm ³
Electricity consumption per cycle, approximately:	270 kWh
One hour at sustain / hold cycle step corresponds to, approximately:	48 kWh

Molybdenum furnace 1400M URQ®

Maximum operating temperature:	1 400 °C
Maximum height of workload, H _{HZ} :	500 mm
Maximum diameter of workload, D _{HZ} :	270 mm
Maximum weight of workload (incl. weight of load basket):	120 kg
Maximum temperature deviation at steady state measured in the gas within the workload volume, at temperatures between 500 °C and maximum temperature and pressures above 20 MPa using workload TC control:	± 10 °C
Number of heating zones:	3 pcs
Number of furnace thermocouples per heating zone, type B:	2 pcs
Number of plug-in for workload thermocouples, type B:	6 pcs
Nominal installed furnace power, approximately:	70 kVA

* The Molybdenum furnace is considered a wear part.
 The deterioration of Molybdenum increases with increasing operating temperature.

Estimated cycle times for Molybdenum furnace 1400M URQ®

Calculated cycle to 1200 °C, 150 MPa with a total workload of 50 kg and sustain time of 3 hours. The workload weight consist of load basket and payload. The calculation is based on that the payload and load baskets have the same thermal mass as steel. A minimum of 15 % free gas flow area through the workload is required for the URQ® cycle.

Cycle step	URQ
Vacuum pumping / flushing 2 times, less than 5 mbar	24
Equalizing	16
Pumping and heating	54
Sustain / hold	180
Cooling to 200 °C	4
Equalizing reclaim of gas	18
Recovery pumping to 4 MPa	23
Exhaust	19
Total [min] incl. sustain/hold time	338
Total [h] incl. sustain/hold time	5,6

Performance data for the estimated cycle above:

Average cooling rate from 1200 °C to 800 °C (measured in the gas): ≥ 25 °C/Sec.

Calculated consumption for the estimated cycle (URQ) above:

Gas consumption per cycle, approximately: 6 Nm³

Electricity consumption per cycle, approximately: 200 kWh

One hour at sustain / hold cycle step corresponds to, approximately: 35 kWh

Graphite furnace 2000G URC®*

Maximum operating temperature:	2 000* °C
Maximum operating temperature under vacuum:	500 °C
Maximum height of workload, H _{HZ} :	820 mm
Maximum diameter of workload, D _{HZ} :	300 mm
Maximum weight of workload (incl. weight of load basket):	250 kg
Maximum temperature deviation at steady state measured in the gas within the workload volume, at temperatures between 500-1750 °C and pressures above 30 MPa using workload TC control:	± 10* °C
Number of heating zones:	3 pcs
Number of furnace thermocouples per heating zone, type C:	1 pcs
Number of plug-in for workload thermocouples, type C:	3 pcs
Nominal installed furnace power, approximately:	180 kVA

* Thermocouples will deteriorate over time at operating temperature above approximately 1750 °C
 The Graphite furnace is considered a wear part.

Estimated cycle times for Graphite furnace 2000G URC®

Calculated cycle to 1750 °C, 150 MPa with a total workload of 80 kg and sustain time of 3 hours.
 The workload weight consist of load basket and payload (limited to 15 parts).
 The calculation is based on that the payload and load baskets have the same thermal mass as steel.
 A minimum of 15 % free gas flow area through the workload is required for the URC® cycle.

Cycle step	URC	URC* without payload	Natural cool
Vacuum pumping / flushing 2 times, less than 5 mbar	26	27	26
Equalizing	20	22	20
Pumping and heating	60	35	60
Sustain / hold	180	180	180
Cooling to 200 °C	35	20	300
Equalizing reclaim of gas	18	20	18
Recovery pumping to 4 MPa	31	34	31
Exhaust	20	22	20
Total [min] incl. sustain/hold time	390	360	655
Total [h] incl. sustain/hold time	6,5	6,0	10,9

* No payload, only one load plate and one cylinder for gas flow guiding.

Calculated consumption for the estimated cycle (URC) above:

Gas consumption per cycle, approximately:	7 Nm ³
Electricity consumption per cycle, approximately:	380 kWh
One hour at sustain / hold cycle step corresponds to, approximately:	90 kWh

Operability

The pressure vessel is designed to operate: 0-24 hrs/day

Control system

Programmable controller (PLC): Rockwell Allen-Bradley

Supervisory System – HMI system: PC based with System Platform(InTouch) from Wonderware

Remote access: eWon

Backup Power (UPS) time, of control system, at power failure: > 20 min

Gas compressor system

Number of compressor(s): 1 pcs

Maximum compressor pressure: 207 MPa

Vacuum system

Number of pump(s): 1 pcs

Vacuum pressure level less than: 5 mbar

Cooling system

Number of pump(s): 1 pcs

Type of backup pump for cooling at electrical power failure: Gas-driven

Maximum outdoor Wet-bulb temperature: 25 °C

Color

The Equipment is painted in color: RAL 5000, RAL 7011 and RAL 7035

Site utilities

Electric power

Supply voltage, 3 phase:	400 / 480 V
Maximum voltage variation:	± 5 %
Frequency:	50 / 60 Hz
Totally installed power for operation with Molybdenum furnace, approximately:	225 kVA
Maximum instant power consumption with Molybdenum furnace, approximate:	180 kVA
Totally installed power for operation with Graphite furnace, approximately:	265 kVA
Maximum instant power consumption with Graphite furnace, approximate:	220 kVA

Pressure medium

The pressure medium in the pressure vessel is clean argon gas (99,995%) according to Quintus Technologies specification. For detail information see specification SE011028 for Molybdenum furnace and SE041142 for Graphite furnace, available on request.

Minimum internal pipe diameter, transfer the gas between the gas storage and pressure vessel, required as per this documents estimated cycle time:	12 mm
Recommended gas storage water volume applicable for a cycle at temperatures above 900 °C and maximum operating pressure:	1.4 m ³
Gas storage pressure:	20 MPa

The gas storage can be built up of several gas containers to form a gas battery of the volume needed.

It is also recommended that the gas storage will be topped up from a liquid tank with the aid of a cryogenic pump and an ambient vaporizer at end of each cycle.

The gas storage shall be provided with a safety valve for storage protection, a gauge for reading the storage pressure and a shut-off valve to isolate it.

The gas supply line from the gas storage shall have lockable block and bleed valves.

Cooling water supply at backup cooling

The external cooling water supply for backup cooling must supply cooling water during electrical power failure and a recommended source is for example tap water.

Cooling water flow, approximately:	50 dm ³ /min
Minimum pressure:	0,3 MPa
Maximum pressure:	0,6 MPa
Maximum inlet temperature:	30°C

Fluid

Oil for hydraulic pumps:	ISO VG 46
Vacuum pump oil:	According to manufacturer's specification
Coolant for the closed vessel cooling system: For detail information see specification SE046961, available on request	Ethylene Glycol / deionized water mixture
Spray water supply for outdoor cooling unit:	Tap water

Indoor operating environment

Ambient temperature:	10 - 35 °C
Humidity maximum:	90 %

Internet access

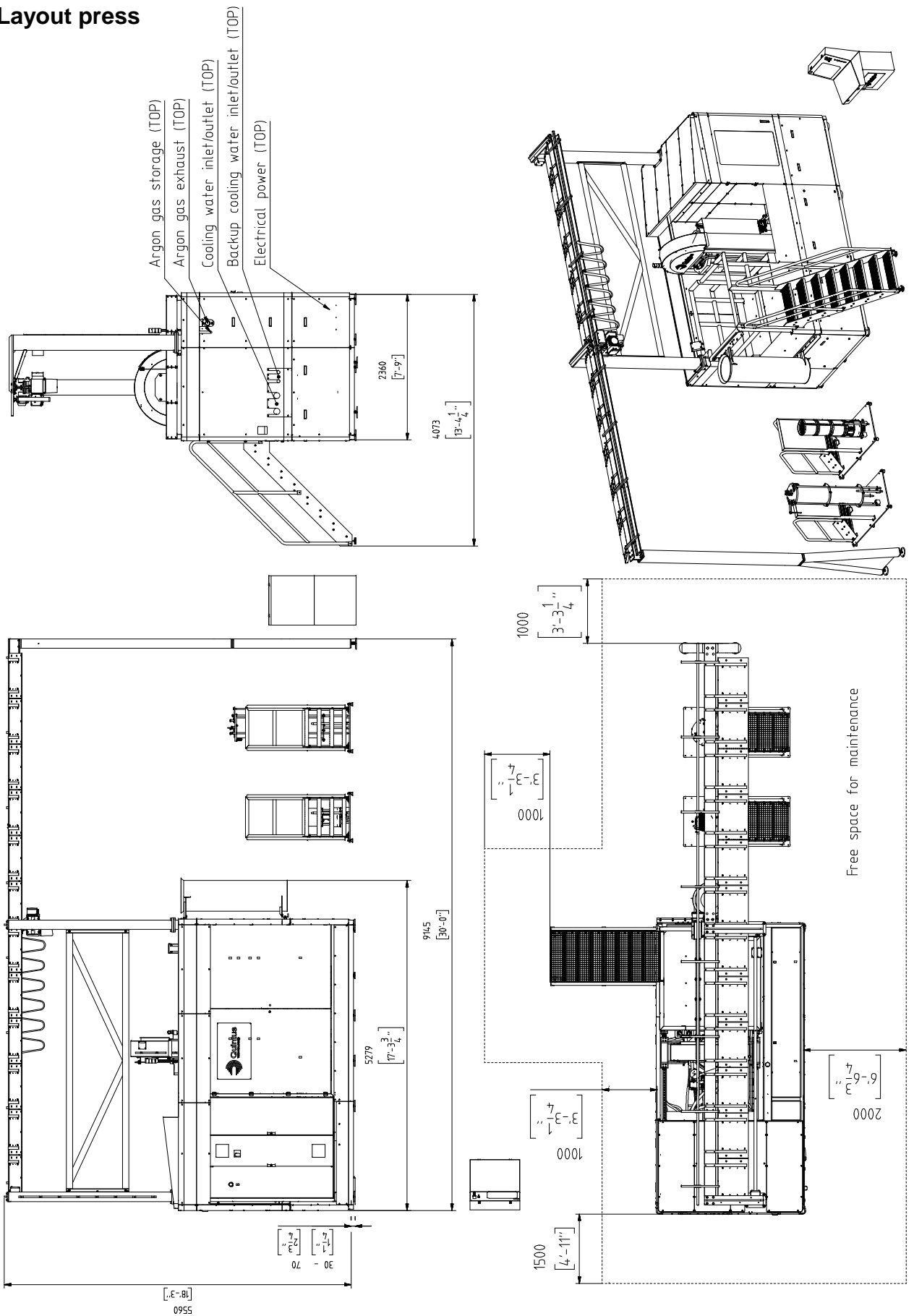
Min bandwidth, down and up-load, for remote access:	2 Mbit/s
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Notes

This Product Data Sheet contains information and presentation of optional character.
The offered scope is defined by the document Scope of Supply.

The figures and performances set forth in this PDS are subject to the equipment being properly installed, used, maintained and or repaired by the user as further set forth in contractual documents.

Layout press



Layout outdoor units

