RCS S7C Settings

Grey Text indicates settings can vary depending on ground conditions or consumable size

Before adjusting any **FEED settings** ensure slides are not overtight - free feed pressure during threading should be below 55 bar

Check **rockdrill accumulators pres and transducer calibrations** prior to adjusting any drill settings

Flushing Air - ensure 3 bar air pressure is maintained by mine services when flushing is active
Flushing water - ensure 2 bar water is maintained by mine services when flushing is active

Compressor - can be set to load 4, unload 6 in the RCS, or adjust motor hyd relief to slow compressor at 5.5 bar.

Air Flow Switch (pressure differential switch) can be replaced by MT Flow switch Kit MT9106 1856 037

350 bar transducer offset = 102 Coefficient = 0.428 (base settings before calibration)
50 bar transducer offset = 102 Coefficient = 0.060 (base settings before calibration)
Greater than 10% variation the sensor should be replaced and recalibrated

Engine idle is set 200 rpm higher than standard to prevent shuddering when the diesel
Hydraulic pump is engaged. Excluding electronic Deutze

Operator Bit settings are adjusted so that bit 1 uses high feed speed and fast rotation,
(ie competent ground). Bits 2 to 4 gradually become slower,
Bit 5 and 6 settings use slowest feed speed and slow rotation, (ie Reamer or broken ground)
Bit 7 is set to Maximum rotation speed for use when bogged / backreaming from blocked hole
Machine : S7C RCS4 /5

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MAINTENANCE TECHNIQUE
UNDERGROUND DRILL RELIABILITY

RCS S7C Optimisation

	Mod completed by
1 - Rig cooling and water mist pump supply Mod	Gav
Reduces rig running temp 2 - 4 Deg while drilling	
2 - Watermist output and waterflow upgrade	Gav
Increases air mist water maximum output by 22L~~/min~~	
3 - Hydraulic temp reduction and drainage mod	Gav
Reduces hyd temp while idle or rod removal by further 1 -2 deg	
4 - Crompressor flow and loading update.	
Stabalises compressor speed, temp and reliability	
5 - Air Flow Switch replacement	
Watermist air flow switch is replaced with stainless manifold and reliable HD sensor	
6 - Cooler shunt mod	
Reduces water spray and corrosion to carrier	
7 - MT gripper arms and inboard sensor set	
Long life, low maint arm with protected RCS sensors	
8 - Feed sensor Cables relacement	
plug and play breakout box and individually replacable cables fitted ot all feed and caro sensors	
9 - 1345 or 1438 MT rod carousel	Gav
oversize carousel enables 20m holes	
10 - Carousel and gripper hydraulic circuit / component change	Gav
Improves carousel and gripper accuracy and auto relaibility	
11 - Dampening circuit and RCS adjustment	
Prevents dampening piston bottom out and failure during hard ground or broken rod event	
12 - Rcs settings adjustments to threading and Auto settings	
Tunes system to rope type feed lengths and hyd flows	
13 - Auto lube adjustments and carrier connection	
Improves centre hitch life and lube system effectivness	
14 - Air mist circuit valve simplification	
Remove unneccesary (common failure) components - remount common service points for easy access	
15 - MT Hose bulkhead and feed components added	
Reduces hose and rope failures	

RCS parameters - DRILLING

		BIT 1	BIT 2	BIT 3	BIT 4	BIT 5
Feed Speed	Max speed manual collaring	**390**				
Valve Y104	Max speed auto collaring	**398**	**395**	**360-370**	**356-365**	**350-365**
	Max speed drilling	**405**	**400**	**372-395**	**365-374**	**360-370**
	Max speed cavity drilling	**390**				
	Min speed lever	**360**				
	Min speed break - Forward	**380**				
	Min speed break - Backward	**375**				
	max speed lever	**460**				
Feed pressure	Feed pressure collaring	**70 bar**	**65**	**65**	**60**	**50**
Valve Y103	Feed pressure drilling	**93 bar**				
	Feed pressure Cavity drilling	**80 bar**				
	Min feed pressure drilling	**20 bar**				
	Max feed press. drilling T32 or T38	**100 bar**				
	Max feed pressure drilling T45<	**110 bar**				
Percussion	Percussion pressure collar	**140**				
Valve Y101	Percussion pressure drilling **1838**	**180 bar**	**180**	**180**	**170**	**170**
	Percussion pressure lose coupling	**200 bar**				
	Percussion pressure cavity drilling	**150**				
	Max current	**700 ma**				
	Long stroke(4050 only)	**-**				
Rotation	Rotation speed drilling **Tubes**	**95rpm**	**85rpm**	**75rpm**	**60rpm**	**45rpm**
Valve Y102	Rotation speed drilling **Speed Rod**	**135rpm**	**115rpm**	**105rpm**	**80rpm**	**65rpm**
	RPCF pressure increase	**20 bar**				
	Pressure increase jamming	**30 bar**	**30**	**30**	**35**	**40**
	Pressure decrease free	**10 bar**				
Dampening	Min dampening pressure	**35 bar**				
From pump flow control	Max dampening pressure	**150 bar**				
	Dampening pressure low percussion	**48 bar**	**48 bar**	**48 bar**	**48 bar**	**48**
	Dampening pressure high percussio	**50 bar**	**50 bar**	**50 bar**	**50 bar**	**50**
Timers	Min collaring time	**1.6 sec**				
	Max Drill time per rod	**8min**				
	Max feed reversing time jamming	**3.0 sec**				
	Min feed reversing time jamming	**0.1 sec**				

The lower the ma the more holdback during drilling soft ground or large bits

Too high value will cause cradle length postioning issues in auto or manual

not used if RPCF is on.

Collaring feed pressure must be high enough to ensure the feed can lift the rods in up holes

Set by driller in options screen 14 - 24

RV1 Relief DP must be set to 160

This value should be set 30 ma above the amount sent to Y100 during full drilling

Max current ensures the percussion pressure drops when a Hp accumulator is blown

MAINTENANCE TECHNIQUE
UNDERGROUND DRILL RELIABILITY

Feed calibration Valve Y103

146ma = 15 bar
204ma = 25 bar
254ma = 40 bar
305ma = 65 bar
342ma = 100bar

Callibration is normally only needed if oil viscosity changes, or a new Y103 feed valve is fitted. Values after callibration more than 30% outside example may indicate Y103 valve or cable fault

adjusted during auto calibration in feed pressure screen ***(ONLY CALIBRATE AT FULL OP TEMP)***

Comments,

Rotation speed ma's can vary depending on oil viscosity, valve condition or rotation motor size

Pressure and flow settings for drilling are divided into a number of menus. Several of these settings can be made specifically for different drill bits. Parameters that can have different values for different drill bits are marked with a drill but symbol. These menus contain a list where you can select drill bit: Drill Bit 1, Drill bit 2…..Drill bit 5.

RCS parameters - Rod Handling

		RHS 27	RHS9/10
RHS - threading	Rotation speed threading (aprox 460ma)	100 RPM	**110 RPM**
Valve - Y155	Rotation pressure threading		**80bar**
	Feed pressure threading	65bar	**80bar**
	Feed pressure threading, low	45 bar	**45 bar**
	Feed speed threading UP	385 ma	**387 ma**
	Feed speed threading DOWN	385 ma	**385 ma**
	Detection pressure threading	80 bar	**70 bar**
	Rotation speed unthreading (aprox 560ma)	Max RPM	**Max RPM**
	Feed pressure unthreading		**160**
	Feed speed unthreading UP	65 bar	**384 ma**
	Feed speed unthreading DOWN	453ma	**380 ma**
must be lower than	**Detection** pressure unthreading	100 bar	**110 bar**
max rot pump pressure.	Time to feed (seconds)	-0.1	**-0.1**
Gripper positions	Arms in Carousel position	**B118:1 ON**	**B118:2 ON**
	Arms in Drill centre position	**B120:1 ON**	**B120:2 ON**
	Carousel rotation - in rod position	**B182 ON**	**B182 ON**

Adjusting cradle positions - First check that the sensor magnet is not damaged.

The most critical adjsutment is the ZERO position - Activate cradle emergency mode and move the cradle to the rear of the feed. Turn cradle emergency mode off. **The Cradle should be (adjuusted via the ropes)15mm from the rear plate**.
Increase or decrease the Offset adjustment at the bottom of the screen to change the sensor value (bottom of screen) to read 0.000 -
M1 to M8 values generally should not need to be changed
Write your machines cradle sensor positions for future referance below

Cradle positions	M1 Drilling up - drilling stop	2.155	1.880
	M1 Drilling down - drilling stop	2.145	1.870
Sensor B307	M2 Top threading pos.	1.957	1.710
	M3 Lead rod stop pos.	0.450	0.580
	M4 Gripper arm protection point	0.500	0.450
	M5 drilling up - rod removal pull back pos	0.335	0.335
	M5 drilling down - rod removal pull back pos	0.325	0.325
	M6 Carrousel height for rod	0.130	0.202
	M7 Gripper guide pos. - threading in	0.105	0.105
	M8 At rear of feed	**0.005**	**0.005**
		1.83 rod	1.52 rod

Comments.

Threading Feed Speed milliamps can vary to set threading feed/rotation timing.
Threading rotation speed is always set aprox 20 rpm slower than unthreading to prevent inertia causing overtension,

Auto Drilling / Removal Parameters

One hole auto - drilling	Initial fixed time Perc, rod add, up	0.3 sec
	Initial perc time rod add up, per rod	0.1 sec
	Retry perc time rod add up	1.2 sec
	Initial fixed time Perc, rod add, down	1.0 sec
	Initial perc time rod add down, per rod	0.1 sec
	Retry perc time rod add down	1.5 sec
	Max retries rod/adaptor stuck	3
	initial collar length	.5 mtrs
Flushing	Half rod flushing cradle position	1.00m
	Extra flushing time	5.0 sec
	Final air blow time fixed	8.0 sec
	Final air blow time per rod	1.5 sec
	Flushing time before drilling fixed up	2.0 sec
	Flushing time before drilling per rod, up	0.8 sec
	Flushing time before drilling fixed down	1.5 sec
	Flushing time before drilling per rod, down	0.3 sec
	Initial collar flush start time up/down	0.0/0.0 sec
Removal	Max retries rod/adaptor stuck	3
	Max retries rod/rod stuck	3
	Max retries rod/adaptor stuck	3
	First retry when adapt with perc	ON
	Anchor return	OFF
Percussion timers	Initial fixed time rod removal, up	0.1 - 0.2
	Initial fixed time rod removal, up, per rod	0.1
	retry time rod/adapter stuck up	1.5 sec
	Retry time rod/rod stuck up	2.0 sec
	Initial fixed time rod removal, down	0
	Initial fixed time removal, down, per rod	0
	retry time rod/adapter stuck down	1.5 sec
	Retry time rod/rod stuck down	1.5 sec
	Final percussion time, fixed	4.0 sec
	Final percussion time, per rod	0.2 sec
Others	Rod length	1.83 / Or 1.52
	Min drill speed	.10 mtr/min
	Hole Length Tolerance	0.4
	Cavity detected speed level	2.5 m/min
	Cavity ended speed level	1.9 m/min
	Min Water Pressure	2
	Min Air Pressure	2
	Emergency Flush after drill stop	ON
	Water Mist pump, min Speed	400 ma
	Water Mist pump, min Speed	1000 ma

Comments,

settings can vary depending on ground conditions

Rig Parameters

Lubrication	Lube frequency	**35 p/min**
	Min air pressure	**3 bar**
	Min oil pressure	**4.0 bar**
	Max oil pressure	**15.0 bar**
	Time before measure	**30 sec**
	Time before stop drilling	**20 sec**
Rig parameters	Min air pressure, compressor	**5.0 bar**
	Max air pressure, compressor	**7.0 bar**
	Hydraulic oil temp, cooling	**55 deg C**
	Hydraulic oil temp, warning	**65 deg C**
	Hydraulic oil temp, Shut down	**77 deg C**
Breakthrough auto stop	Bas cradle speed level collaring	**1.9 m/min**
	Bas cradle speed level drilling	**2.5 m/min**
	Bas detect time	**1.0 sec**
	Bas active length	**2 mtrs**
	Bas perc fixed time	**2.2 sec**
	Bas perc fixed time, per rod	**0.1 sec**
Oil level sinking sensor	Offset	-760
	Coefficient	0.174
Levers		
Callibration Status	Callibrated	Changes to 'not callibrated' when callibrating.
Callibration Mode ☐	Tick this box to begin callibration	
Dead Zone X Y	**5%**	
Dead Zone Z (button)	**50%**	
Caution - When callibration mode is ticked, lever calibration is lost. The system now requires you to move the lever to every position and activate both buttons		

MT RCS Trouble Shooting

No RCS start up	Check battery power is over 23v, check fuses and breakers in A cab
	Check K119 (RCS start relay and Fuse F110
	Check fuses on RCS power supply boxes, 6 green LED indicates power and fuses ok.
No pump start	Check if any guards are active in RCS 'Guards' screen. Check power supply to 1000v cabinet,
	Check 1000v cabinet breakers and warning lamps.
	Check e-stops, if an e-stop is tripped the cabin tramming light will be on.
No Positioning	Tick option box 'Deactivate sensor dependency' in the options screen to ignore boom sensors
movement	Check sensor inputs to ARI screen or D120 module status to isolate sensor at fault
No percussion	Drilling percussion can only engage when the water or air flow switch is on.
Valve Y101	Activate rod break and check the actuations screen, if there is no output to *Y101*
Sensor B101	the system has a guard active. ie lube. If the output is OK there is an electrical or Hyd problem
	Also ensure that 'rod add only' is not selected in the options screen.
No high percussion	Refer DPCI, high percussion is only available once a certain dampening pressure
damper flow reg valve	is achieved (shown in dampening parameters screen). Check that static dampening
	is aprox 48bar.(*) RPCF should be on and set to 18 bar +/- 6bar.
No drifter feed	The Drifter will not move if input from either the linear sensor or the gripper sensors
Gripper B118 & B120	is lost. The gripper arm sensor must read B118:1 and :2 ON to allow the drifter to
Linear sensor B307	move past the arms. Activate gripper or cradle emergency mode to isolate which
Valve Y104 flow	sensor is at fault(!).
Valve Y103 pressure	(*) Check Actuations screens to view outputs
No Rotation	Acitvate emergency modes for grippers and rockdrill
Y102	Check connections to Rotation valve - manualy actuate
Y155	Threading pressure reduction should only be active during forward threading
No gripper arm	Try gripper movement after activating 'gripper emergency mode' .(!)
movement	Move the drifter to the rear of the feed rail and check that the linear sensor reads
	0 (+/- 5). Activate cradle or gripper emergency mode to isolate which sensor is at
Valve Y301 swing	fault. Check D120(resolver module) status in modules screen.
No indexing	Check input from B182 to the sensor screen, check sensor and cable for damage.
B182 caro position	Check signal to the Indexing valve - Valve Y303
No water flushing	Check that water mist is not selected in the options screen. Ensure the auto Flushing
Sensor B141	button is illuminated on the right key panel.
Water vlave Y110	Check LED on Y110 pilot valve comes on. If so check flow through, a split diaphragm is common
Min water 2 bar	Check water strainer at rear of machine
No air (mist) flushing	Check the pressure sensor (under flushing reel) is reading correctly
Flow Sensor B265	Check that the flow senor activates when air flushing is flowing
Valve Y115	Check air valve DIN plug lights up to open goin valve - check diaphragm in the valve if not opening
Pressure B318	Check air strainer under flushing reel
Low flushing flow	First check that valves activate and the flushing meduim flows from the shank.
Air flow sensor B265	Fault during water flushing - check that sensor B141 activates when water flows from the shank
Water flow B141	Fault during Air/mist flushing - check that sensor B265 activates when air flows from the shank
Flushing fault	First check water pressure to the machine, and that water flows to the shank when active
Flushing Fault Low	flushing starts indicates mine supply issue or blocked strainer. Or waterpump is not engaging.
Air sensor B318	Fault during water flushing - check that sensor B141 activates when water flows from the shank
Water sensor B136	Fault during Air/mist flushing - check that sensor B265 activates when air flows from the shank
Poor penetration or	Check RPCF is set correctly and rotation speed is appropriate for ground conditions
excess consumable	Check accumulator charge pressures, check shank alignment to BSH and gripper
breakages	arms. Test all pressure transducers for correct calibration (*).
Auto rod handling	Check Parameter settings in RHS 'threading' screen.
problems	note where the machine stops in the sequence to diagnose the component or setting at fault
Lube Error	Check compressor air suppy pressure, Check Lube oil pressure, check air and oil to Drifter
Compressor Fault	Check electric unloader pilot solenoid, light on and active. Check speed of the compressor
	Ensure the inlet is not blocked or filter clogged
	Check unloader valve condition and operation

Refer workshop manual for more diagnosis advice, schematics and seettings.

(*) Refer test / adjustment / replacement procedure in maintenance instructions.

(#) The compressor must supply at least 3 bar for flushing pilot valves and ECL to operate.

(!) If movement is restored, an RCS guard is on, or a sensor input is faulty. If output is displayed in actuations screen (from the I/O module to the valve) the fault is likely mechanical or hydraulic

Note : If a module or screen is replaced the parameters and software must be reloaded, carefully follow the procedure detailed in the maintenance instructions book (control system section).

Hose lengths - Drifter and feed

1838 S7D 1.8M - Dependant on rope adjustment

Hose	Hose Size (	Fitting	Total Length	Connection	Part No.
Percussion Return	3/4	12	2380	Perc hose (bottom of drifter)	MT1217-2380
Percussion Pressure	3/4	12	2490	Perc hose (middle of drifter)	MT1217-2490
Flushing	3/4	12	3180	Flushing head	MT1217-3180
Drain	1/2	10	2830	Front cradle port	MT0814-2830
Dampening	3/8	8	2570	Inner damper body hose	MT0612-2570
Lube	3/8	8	2570	outer damper body hose	MT0612-2570
Feed Top port	1/2	10	1990	Bulkhead to feed cyl	MT0814-1900
Feed Lower port	1/2	10	1990	Bulkhead to feed cyl	MT0814-1900
Rotation R	1/2	10	2560	Rear Cradle port	MT0814-2560
Rotation F	1/2	10	2690	Middle Cradle port	MT0814-2690
Backhammer P	3/8	6	2890	Ext P port	MT0612-2889
Backhammer T	3/8	8	2880	Ext T port	MT0612-2880

Hose	Hose Size (	Fitting	Total Length	Connection	Part No.
Percussion Return	3/4	12		Perc hose (bottom of drifter)	MT1217-2380
Percussion Pressure	3/4	12		Perc hose (middle of drifter)	MT1217-2490
Flushing	3/4	12		Flushing head	MT1217-3180
Drain	1/2	10		Front cradle port	MT0814-2830
Dampening	3/8	8		Inner damper body hose	MT0612-2570
Lube	3/8	8		outer damper body hose	MT0612-2570
Feed Top port	1/2	10		Bulkhead to feed cyl	MT0814-1900
Feed Lower port	1/2	10		Bulkhead to feed cyl	MT0814-1900
Rotation R	1/2	10		Rear Cradle port	MT0814-2560
Rotation F	1/2	10		Middle Cradle port	MT0814-2690
Backhammer P	3/8	6		Ext P port	MT0612-2889
Backhammer T	3/8	8		Ext T port	MT0612-2880

HYD system adjustments S7C/D

Setting	Factory	MT Site setting	Read from / Adjust at
Positioning pump Standby	18 Bar	18 Bar	Amps A CAB = _____ A
Positioning pump pressure	220 Bar	210 Bar	Amps A CAB = _____ A
Percussion full	200 Bar	180 Bar (Max 200 Bar)	Amps A CAB = _____A
Percussion Collaring	130-140 Bar	140 Bar	Amps A CAB -=_____A
Max Rotation Pressure	RCS - 210 Bar	RCS - 200 Bar	CARTRIGE IN Y102 ROT VALVE
Rotation speed drilling	75-150 Rpm	(Tubes) 65-125 RPM (Speed Rods) 65-150 Rpm	Depending on size of Drill Bit Bit 1 at fastest setting Bit 5 at slowest for Reaming/Broken Ground
Rotation speed reaming	45 - 80 rpm	46 - 80 rpm	DCS - flow control. RCS - Rot screen
MAX Dampening pressure (relief)	120 Bar	160 Bar	Full feed on dampining piston - RV1
Dampening pressure (static)	40 Bar	45-50 Bar	Flow control on pump
Water pump speed	3000 RPM	3000 RPM	Fixed
Compressor speed GAR5	3500 RPM	3000 RPM	HYD valve
Compressor speed LE7-10	210 BAR	Set to slow @6.5 BAR	Relief on back of HYD motor
Diesel Positioning Pressure	DCS 210 Bar RCS 190 BAR	DCS 210 Bar RCS 190 BAR	DCS - Relief valve RCS - A10v pump
DCS (S7D ONLY) CONTROL ADJUSTMENTS			
Max Rotation Pressure	DCS - 120 Bar	DCS - 120 Bar	
DPCI (Damper Pressure Controlled Impa	52 Bar	46 Bar	
Feed pressure collaring	45 Bar	70 Bar	Bit Dependant
Feed pressure Drilling (top rail)	50 Bar	93 Bar	With RPCF off
Feed pressure Drilling (split feed)	NA	NA	
Max feed pressure reaming	50 Bar	70 Bar	
Split feed pressure return	NA	NA	
RPCF (Rotation Pressure Controlled Feed) reduction	15 Bar	20 Bar	
Anti jam activation	85 Bar	95 Bar	
Compressor receiver pressure	6-8 Bar	6-8 Bar	
Compressor Max hyd pressure	230 Bar	180 Bar	
Lube air pressure to rock drill	2.5-3 Bar	3 Bar	
Lube Pulse per minute	30 pulses/min	30 pulses/min	