4.3 SRM

4.3.1 TT1413: Transport Order and Completion (SRM Navette)

4.3.1.1 Purpose of This Telegram Type

The telegram is used for the transmission of

a) a transport order to Navette

b) the transport completion to Navette

c) transport info to the MFS

d) a deletion order to the SRM

4.3.1.2 Sending Direction

MFS <-> Navette

4.3.1.3 Sending Time

The sending times depend on the system events, so they are spontaneous.

a) Transport order from MFS to Navette

b) Transport event from Navette to MFS

c) Transport notice from Navette to MFS

4.3.1.4 Structure

4.3.1.4.1 Remark

The structure of the TT1413 is depending on the amount of LHDs (“forks”) and the maximum amount of TUs on LHD. The needed objects (LHD-Header, TU-Part) will be combined as needed for the project. Each independent LHD gets its own order code.

4.3.1.4.2 Structure, Version 2: 2 LHD, 2 TU/LHD (TST2020) (Gripper-Navette)

No. Byte	LHD no.	TO pos.	Field Content		Type
0			Telegram sender ID	MSB	D
1				LSB	
2			Telegram receiver ID	MSB	D
3				LSB	
4			Telegram type	MSB	D
5				LSB	
6			Telegram sub type	MSB	D
7				LSB	
8			Version	MSB	D
9				LSB	
10			Request ID	MSW:MSB	D
11				MSW:LSB	
12				LSW:MSB	
13				LSW:LSB	
14			Movement options 1 (Reserve)	MSB	D
15				LSB	

No. Byte	LHD no.	TO pos.	Field Content			Type
16		for whole machine	Movement options 2	X (% of a and v)	MSB	D
17					LSB	
18				Y (% of a and v)	MSB	D
19					LSB	
20				Z (% of a and v)	MSB	D
21					LSB	
22				Reserve	MSB	D
23					LSB	
24	1	for all TUs of this LHD	SRM extern (rack, CS)	Aisle	MSB	D
25					LSB	
26				X-coordinate	MSW:MSB	D
27					MSW:LSB	
28					LSW:MSB	
29					LSW:LSB	
30				Y-coordinate	MSB	D
31					LSB	
32				S-coordinate	MSB	D
33					LSB	
34				D-coordinate	MSB	D
35					LSB	
36			SRM intern (fork)	SRM number	MSB	D
37					LSB	
38				LHD number	MSB	D
39					LSB	
40				Place on LHD	MSB	D
41					LSB	
42				Gripper opening width	MSB	D
43					LSB	
44				Type of extern location	MSB	D
45					LSB	
46			Amount of TUs		MSB	D
47					LSB	
48			Order		MSB	D
49					LSB	
50			Order extension 1			M
51			Order extension 2			M
52			Acknowledge		MSB	D
53					LSB	
54			Acknowledge extension 1			M
55			Acknowledge extension 2			D

No. Byte	LHD no.	TO pos.	Field Content			Type
56		TU 1.1	Type		MSB	D
57					LSB	
58			Type flags 1			M
59			Type flags 2			M
60			Length		MSB	D
61					LSB	
62			Width		MSB	D
63					LSB	
64			Height		MSB	D
65					LSB	
66			Weight		MSB	D
67					LSB	
68			Error flags 1			M
69			Error flags 2			M
70			TU ID (Barcode)		1st place	C
71					2nd place	
72					3rd place	
73					4th place	
74					5th place	
75					6th place	
76					7th place	
77					8th place	
78					9th place	
79					10th place	
80					11th place	
81					12th place	
82					13th place	
83					14th place	
84					15th place	
85					16th place	
86					17th place	
87					18th place	
88					19th place	
89					20th place	

No. Byte	LHD no.	TO pos.	Field Content			Type
90		TU 1.2	Type		MSB	D
91					LSB	
92			Type flags 1			M
93			Type flags 2			M
94			Length		MSB	D
95					LSB	
96			Width		MSB	D
97					LSB	
98			Height		MSB	D
99					LSB	
100			Weight		MSB	D
101					LSB	
102			Error flags 1			M
103			Error flags 2			M
104			TU ID (Barcode)		1st place	C
105					2nd place	
106					3rd place	
107					4th place	
108					5th place	
109					6th place	
110					7th place	
111					8th place	
112					9th place	
113					10th place	
114					11th place	
115					12th place	
116					13th place	
117					14th place	
118					15th place	
119					16th place	
120					17th place	
121					18th place	
122					19th place	
123					20th place	

No. Byte	LHD no.	TO pos.	Field Content			Type
124	2	for all TUs of this LHD	SRM extern (rack, CS)	Aisle	MSB	D
125					LSB	
126				X-coordinate	MSW:MSB	D
127					MSW:LSB	
128					LSW:MSB	
129					LSW:LSB	
130				Y-coordinate	MSB	D
131					LSB	
132				S-coordinate	MSB	D
133					LSB	
134				D-coordinate	MSB	D
135					LSB	
136			SRM intern (fork)	SRM number	MSB	D
137					LSB	
138				LHD number	MSB	D
139					LSB	
140				Place on LHD	MSB	D
141					LSB	
142				Gripper opening width	MSB	D
143					LSB	
144				Type of extern location	MSB	D
145					LSB	
146			Amount of TUs		MSB	D
147					LSB	
148			Order		MSB	D
149					LSB	
150			Order extension 1			M
151			Order extension 2			M
152			Acknowledge		MSB	D
153					LSB	
154			Acknowledge extension 1			M
155			Acknowledge extension 2			D

No. Byte	LHD no.	TO pos.	Field Content			Type
156		TU 2.1	Type		MSB	D
157					LSB	
158			Type flags 1			M
159			Type flags 2			M
160			Length		MSB	D
161					LSB	
162			Width		MSB	D
163					LSB	
164			Height		MSB	D
165					LSB	
166			Weight		MSB	D
167					LSB	
168			Error flags 1			M
169			Error flags 2			M
170			TU ID (Barcode)		1st place	C
171					2nd place	
172					3rd place	
173					4th place	
174					5th place	
175					6th place	
176					7th place	
177					8th place	
178					9th place	
179					10th place	
180					11th place	
181					12th place	
182					13th place	
183					14th place	
184					15th place	
185					16th place	
186					17th place	
187					18th place	
188					19th place	
189					20th place	

No. Byte	LHD no.	TO pos.	Field Content			Type
190		TU 2.2	Type		MSB	D
191					LSB	
192			Type flags 1			M
193			Type flags 2			M
194			Length		MSB	D
195					LSB	
196			Width		MSB	D
197					LSB	
198			Height		MSB	D
199					LSB	
200			Weight		MSB	D
201					LSB	
202			Error flags 1			M
203			Error flags 2			M
204			TU ID (Barcode)		1st place	C
205					2nd place	
206					3rd place	
207					4th place	
208					5th place	
209					6th place	
210					7th place	
211					8th place	
212					9th place	
213					10th place	
214					11th place	
215					12th place	
216					13th place	
217					14th place	
218					15th place	
219					16th place	
220					17th place	
221					18th place	
222					19th place	
223					20th place	

4.3.1.4.3 Structure, Version 2: 1 LHD, 2 TU/LHD (TST1020) (Gripper-Navette-Lift)

No. Byte	LHD no.	TO pos.	Field Content			Type
0			Telegram sender ID		MSB	D
1					LSB	
2			Telegram receiver ID		MSB	D
3					LSB	
4			Telegram type		MSB	D
5					LSB	
6			Telegram sub type		MSB	D
7					LSB	
8			Version		MSB	D
9					LSB	
10			Request ID		MSW:MSB	D
11					MSW:LSB	
12					LSW:MSB	
13					LSW:LSB	
14			Movement options 1 (Reserve)		MSB	D
15					LSB	
16		for whole mach-ine	Movement options 2	X (% of a and v)	MSB	D
17					LSB	
18				Y (% of a and v)	MSB	D
19					LSB	
20				Z (% of a and v)	MSB	D
21					LSB	
22				Reserve	MSB	D
23					LSB	
24	1	for all TUs of this LHD	SRM extern (rack, CS)	Aisle	MSB	D
25					LSB	
26				X-coordinate	MSW:MSB	D
27					MSW:LSB	
28					LSW:MSB	
29					LSW:LSB	
30				Y-coordinate	MSB	D
31					LSB	
32				S-coordinate	MSB	D
33					LSB	
34				D-coordinate	MSB	D
35					LSB	
36			SRM intern (fork)	SRM number	MSB	D
37					LSB	
38				LHD number	MSB	D
39					LSB	
40				Place on LHD	MSB	D
41					LSB	
42				Gripper opening width	MSB	D
43					LSB	
44				Type of extern location	MSB	D
45					LSB	
46			Amount of TUs		MSB	D
47					LSB	

No. Byte	LHD no.	TO pos.	Field Content			Type
48			Order		MSB	D
49					LSB	
50			Order extension 1			M
51			Order extension 2			M
52			Acknowledge		MSB	D
53					LSB	
54			Acknowledge extension 1			M
55			Acknowledge extension 2			D
56		TU 1.1	Type		MSB	D
57					LSB	
58			Type flags 1			M
59			Type flags 2			M
60			Length		MSB	D
61					LSB	
62			Width		MSB	D
63					LSB	
64			Height		MSB	D
65					LSB	
66			Weight		MSB	D
67					LSB	
68			Error flags 1			M
69			Error flags 2			M
70			TU ID (Barcode)		1st place	C
71					2nd place	
72					3rd place	
73					4th place	
74					5th place	
75					6th place	
76					7th place	
77					8th place	
78					9th place	
79					10th place	
80					11th place	
81					12th place	
82					13th place	
83					14th place	
84					15th place	
85					16th place	
86					17th place	
87					18th place	
88					19th place	
89					20th place	

No. Byte	LHD no.	TO pos.	Field Content			Type
90		TU 1.2	Type		MSB	D
91					LSB	
92			Type flags 1			M
93			Type flags 2			M
94			Length		MSB	D
95					LSB	
96			Width		MSB	D
97					LSB	
98			Height		MSB	D
99					LSB	
100			Weight		MSB	D
101					LSB	
102			Error flags 1			M
103			Error flags 2			M
104			TU ID (Barcode)		1st place	C
105					2nd place	
106					3rd place	
107					4th place	
108					5th place	
109					6th place	
110					7th place	
111					8th place	
112					9th place	
113					10th place	
114					11th place	
115					12th place	
116					13th place	
117					14th place	
118					15th place	
119					16th place	
120					17th place	
121					18th place	
122					19th place	
123					20th place	

4.3.1.5 Description of the Fields – Header Part

4.3.1.5.1 Overview

Note: The shown values are only examples and need to be adjusted for each project!

Field	Description	
Telegram sender ID	1121 …1124; 1221 …1224 2121 …2124; 2221 …2224 3121 …3124; 3221 …3224 4121 …4124; 4221 …4224 5121 …5124; 5221 …5224 6121 …6124; 6221 …6224	Controller Nxxxx: 4*2*6 = 48 Navette; (naming see 3.3.2.3.3ff)
Telegram receiver ID	*1081,* 1082 … 1085, *1086* *2081,* 2082 … 2085, *2086* *3081,* 3082 … 3085, *3086* *4081,* 4082 … 4085, *4086* *5081,* 5082 … 5085, *5086* *6081,* 6082 … 6085, *6086*	Controller NLxxxx: 4 x 6 = 24 Navette Lifts (naming see 3.3.2.3.3ff)
	201	MFS
Telegram type	1413	TT1413: Navette transport order, notice and completion (only half cycle)
Telegram sub type	see chapter 4.3.1.5.2, "Telegram Sub Type"	
Version	see chapter 4.3.1.5.3, "Version"	
Request ID	1 ... 4,294,967,295	distinct telegram identifier from MFS[99]
	0	Identification for orders generated by SOC (TU input, setting the place of TU with data)
Movement options 1	Reserve	
Movement options 2: X, Y, Z	30 ... 100	maximum - acceleration in % of a_{max} - deceleration in % of $-a_{max}$ - speed in % of v_{max}

4.3.1.5.2 Telegram Sub Type

The number shows the combination of the TT1413 parts, depending on the LHD arrangement.

The “telegram sub type” is combined this way: `<# of LHDs>0<TUs per LHD>0`. The “0”s are reserved for further derivate.

Value	FiV[100]	U[101]	Description	Usual Device	Usual TU Type
1020	≥0	n	1 LHD, 1 TU/LHD (see 4.3.1.4.3)	Navette Lift	Bin, Cartons
2020	≥0	n	2 LHDs, 2 TUs/LHD (see 4.3.1.4.2)	Navette	Bin, Cartons

4.3.1.5.3 Version

The number shows the used version of this telegram type.

Value	U	Description	Remark
1	n	initial version (TZ, Heinemann)	
2	y	Gripper version (Metcash)	X-coordinate is not 2 but 4 bytes wide

[99] like MFS-ID, but could be for more than 1 TU

[100] **F**eature **i**n **V**ersion

[101] **U**sed in this project?

4.3.1.6 Description of the Fields – Part LHD

4.3.1.6.1 Navette Lift Specific

Field		Description	
SRM	Aisle – No.	1000 2000 3000 4000 5000 6000	Aisle number
extern	X-coordinate (Version 2)	0	X- coordinate not used for Lift
	Y-coordinate	1 ... 22	Y – coordinate Lift
	S-coordinate (side)	1	Direction left
		2	Direction right
	D-coordinate (deepness)		See 2.3.1.10.5, "Depth Value for Put/Get Order"; depth = 0 for positioning not allowed!
SRM	SRM – No.	1082 ... 1085 2082 ... 2085 3082 ... 3085 4082 ... 4085 5082 ... 5085 6082 ... 6085	SRM number (Lift)
intern	LHD – No.	1	Number of load suspension device
	Place on LHD	Currently set to fixed values depending on fork type	
		0; 1 ... 2	Bin: place number not relevant for Navette
	Gripper opening width (Version 2)	0 600	Value set for fork and rack clearing orders only; otherwise value could be set by MFS to 0

4.3.1.6.2 Navette Specific

Field		Description	
SRM	Aisle – No.	1101 ... 1104; 1201 ... 1204 2101 ... 2104; 2201 ... 2204 3101 ... 3104; 3201 ... 3204 4101 ... 4104; 4201 ... 4204 5101 ... 5104; 5201 ... 5204 6101 ... 6104; 6201 ... 6204	Aisle number
extern	X-coordinate (Version 2)	405 ... 117645	X- coordinate absolute in mm (Gripper Navette)
	Y-coordinate	1 ... 5	Y – coordinate Navette
	S-coordinate (side)	1	Direction left
		2	Direction right
	D-coordinate (deepness)		See 2.3.1.10.5, "Depth Value for Put/Get Order"; depth = 0 for positioning not allowed!
SRM	SRM – No.	1121 ... 1124; 1221 ... 1224 2121 ... 2124; 2221 ... 2224 3121 ... 3124; 3221 ... 3224 4121 ... 4124; 4221 ... 4224 5121 ... 5124; 5221 ... 5224 6121 ... 6124; 6221 ... 6224	SRM number (Navette)
intern	LHD – No.	1 ... 2	Number of load suspension device
	Place on LHD	Currently set to fixed values depending on fork type	
		0; 1 ... 2	Bin: place number not relevant for Navette

Field		Description	
	Gripper opening width (Version 2)	0 600	Value set for fork and rack clearing orders only; otherwise value could be set by MFS to 0

4.3.1.6.3 General

Field	Description	
Amount of TUs	0; 1 ... 2	Amount of TUs with should be enter/leave the LHD
Order	Order reason (only for the direction MFS -> SOC). Used order codes are noted in chapter 4.3.1.6.5.1	
Order extension	Special information about the TO (only for the direction MFS -> SOC). Used flags are noted in chapter 4.3.1.6.5.2 + 4.3.1.6.5.3	
Acknowledge	Order completion (only for the direction SOC -> MFS). Used codes are noted in chapter 4.3.1.6.6.1	
Acknowledge extension	Special information about the TC (only for the direction SOC -> MFS). Used flags are noted in chapter 4.3.1.6.6.2 + 4.3.1.6.6.3	
Type of extern location	0	location type not provided by MFS
	1	usual storage location
	2	Transfer location Lift -> Navette
	3	Transfer location Navette -> Lift
	11	Transfer location Lift -> CS
	12	Transfer location CS -> Lift

4.3.1.6.4 Relevance Codes for Order and Acknowledge Tables

The order and acknowledge codes relevance is depending on SRM type, LHD configuration and rack type. This table defines the relevance codes used in the coming up tables.

Code in relevance row	TU type	LHD configuration (TST[102])	Rack configuration	Remark
NG1020V	Bin	1020	variable deep	Navette Gripper Lift
NG2020V	Bin	2020	variable deep	Navette Gripper SRM

[102] **T**elegram **S**ub **T**ype; some features are depending on the LHD type. See Generic IF SOC for SRM (TT14xx), chapter 4.2.1.5.2 for an overview of already used telegram sub types.

4.3.1.6.5 Order

Only for the direction MFS->SOC.

4.3.1.6.5.1 Order Codes

Most footnotes moved to Generic IF SOC for SRM (TT14xx), chapter 5.5. Please refer there for details about the order codes.

Order Code	Comparable old OS1 code	Topic	Feature in version	NG1020V[103]	NG2020V[103]	Description
0 14000	0	-	≥0	y	y	void
14011	(2)	get	≥0	y	y	Get order
14012	(4)		≥0	y	y	Follow up get order
14013	-		0-1	-	-	Rack clearing order / follow up rack clearing order
14014	-		0-1	-	-	CS transfer location clearing order / follow up CS transfer location clearing order
14013	-		≥2	y[104]	(y) 105	Rack clearing order
14014	-		≥2	y[104]	-	CS transfer location clearing order
14015	-		≥2	y[104]	(y)[105]	Follow up rack clearing order
14016	-		≥2	y[104]	-	Follow up CS transfer location clearing order
14021	(2)	put	≥0	y	y	Put order
14022	(4)		≥0	y	y	Follow up put order
14023	-		0-1	-	-	Fork clearing order / follow up fork clearing order (to CS transfer location only)
14023	-		≥2	y[104]	-	Fork clearing order (to CS transfer location only)
14024	-		≥2	y[104]	-	Follow up fork clearing order (to CS transfer location only)
14031	5	pos.	≥0	y	y	Positioning order
14032	6		≥0	y	y	Follow up positioning order
14041			≥1	-	-	Stocktaking order
14042			≥1	-	-	Follow up stocktaking order
14091	-	*PLC*	*≥1*	*n*	*n*	*SRM internal order (Rundlaufprogramm)*
14092	-		*≥1*	*n*	*n*	*SRM internal follow up order (Rundlaufprogramm)*
14101	101	man	≥0	n[106]	n[106]	Data/order deletion: a specific TO
14103	103		≥0	n[106]	n[106]	Data/order deletion: all TOs of this device
14211		get	≥2			Get TU start order (part 1 of 2)
14212			≥2			Get TU end order (part 2 of 2)
14213			≥2			TU Rack clearing start order (part 1 of 2)
14214			≥2			TU Rack clearing end order (part 2 of 2)
14215			≥2			Get orbiter order
14221			≥2			Follow up get TU start order (part 1 of 2)
14222			≥2			Follow up get TU end order (part 2 of 2)
14223			≥2			Follow up TU rack clearing start order (part 1 of 2)
14224			≥2			Follow up TU rack clearing end order (part 2 of 2)
14225			≥2			Follow up get orbiter start order
14231		put	≥2			Put TU start order (part 1 of 2)
14232			≥2			Put TU end order, orbiter moves on SRM (part 2 of 2)

[103] For abbreviation explanations see chapter 4.3.1.6.4.

[104] For bi – directional lifts only (in- and outlet from/to CS)

[105] Only possible, if one width class is used only

[106] Not implemented yet. Will be discussed again, after TO deletion feature was implemented in Visu.

Order Code	Comparable old OS1 code	Topic	Feature in version	NG1020V103	NG2020V103	Description
14233			≥2			Put TU end order, orbiter stays in channel (part 2 of 2)
14235			≥2			Put orbiter order
14241			≥2			Follow up put TU start order (part 1 of 2)
14242			≥2			Follow up put TU end order, orbiter moves on SRM (part 2 of 2)
14243			≥2			Follow up put TU end order, orbiter stays in channel (part 2 of 2)
14245			≥2			Follow up put orbiter order
14251		pos.	≥2			Positioning order with orbiter contact (battery status)
14252			≥2			Follow up positioning order with orbiter contact (battery status)
14261			≥2			Stocktaking start order (part 1 of 2)
14262			≥2			Stocktaking end order, orbiter moves on SRM (part 2 of 2)
14263			≥2			Stocktaking end order, orbiter stays in channel (part 2 of 2)
14271			≥2			Follow up Stocktaking start order (part 1 of 2)
14272			≥2			Follow up Stocktaking end order, orbiter moves on SRM (part 2 of 2)
14273			≥2			Follow up Stocktaking end order, orbiter stays in channel (part 2 of 2)
14911		extra	≥1	-	-	Tugger train: Release TUs from supply zone 1 to zone 2
14912			≥1	-	-	Follow up Tugger train: Release TUs from supply zone 1 to zone 2

4.3.1.6.5.2 Order Extension 1

Bit	FiV	NG1020V103	NG2020V103	Description
0	≥0	y	y	Switch to failure status?[107]
				0 no: Automatic error handling The SRM sends a transport completion, but it does not switch into its failure state. Buffered TOs will be rejected to MFS too (Ack. code = 14281) Then, the SRM waits for a follow-up order.
				1 yes: Manual error handling The SRM switches over to error condition. TO will be stay in the SRM which will re-sumed after switching back to automatic mode.
1	≥0	y	y	Disable check of TU ID while taking over TU from CS?[108]
				0 no: check enabled
				1 yes: check disabled
2				
3	≥0	n	n	Disable check of TU type while taking over TU from CS?
				0 no: check enabled
				1 yes: check disabled
4	≥1	(y)	(y)	Navette: This order will be executed at a transfer location from/to a lift Warning: Dangerous feature; Use this flag only, if there is a directive from project management: see chapter see Generic IF SOC for SRM (TT14xx), chapter 5.5.4.1
5	≥1	n	n	Orbiter: after an AC14213: disable foil detection; use slow drive speed
6				
7				

4.3.1.6.5.3 Order Extension 2

Bit	FiV	NG1020V103	NG2020V103	Description
0	≥1	n	n	Navette[109]: Disable occupancy sensor for depth 1
1	≥1	n	n	Navette[109]: Disable occupancy sensor for depth 2
2	≥1	n	n	{* Positioning of TU on fork for next "put to rack" during "get from CS":[110] 1 = side 1; 0 = side 2 *}
3				
4				
5				
6				
7				

[107] Only for acknowledge reasons from ack. type "NM" or "TP2" (see 4.3.1.6.6.1, row "Ack. Type"); for other ack. types the automatic error handling is used (fix setting in the SRM program).

[108] Logical inverted compared to TT10/TT11: default is now to check the TU-ID

[109] Usage currently only at Heinemann Erlensee, since there is rack occupancy installed (March 2014).

[110] Not for Orbiter; See Generic IF SOC for SRM (TT14xx), chapter 5.6.3.32

4.3.1.6.6 Acknowledge

Only for the direction SOC->MFS.

4.3.1.6.6.1 Acknowledge Codes

Notes:
1. Gray marked lines are not implemented in the PLC standard program yet. They **must not** be used.
2. Usage of yellow marked lines depends on variety of TU types and dimension classes.
3. Usage of blue marked lines depends on SRM configuration (like more than 1 SRM/aisle?).
4. Codes written in red are under discussion!

Most footnotes moved to Generic IF SOC for SRM (TT14xx), chapter 5.6. Please refer there for details about the acknowledge codes.

Acknowledge Code	Comparable old OS2 code	Ack. Type[111]	Scope of telegram check	Check time[112]	Feature in version	NG1020V[103]	NG2020V[103]	Description
0 14000	0	-	-	-	≥0	y	y	void
14001	1	TC	-	R	≥0	y	y	OK (TO finished successfully without problems)
14003	-	NM	-	R	≥1	n	n	Multi hoist: TO execution aborted (other TO already finished)
14004	4	NM	-	R	≥0	n	y	TO not executed (TO of other LHD failed/not executable)
14005	-	NM	-	R	≥1	n	y	TO not executed, because simultaneous execution with TO of other LHD not possible (Navette only)
14015	*205*	*TAD*	-	*R*	-	*n*	*n*	*TU set (unexpected TU input by data manipulation)*
14021	*21*	*TI*	-	*R*	-	*n*	*n*	*Info (for aisle changer when leaving / entering the aisle)*
14081	32	NA		R	≥0	y	y	Request ID already used
14091	204	TD	-	R	≥0	n[106]	n[106]	TO deleted manually (NTOP, Visu, MFS)
14092	-	TD	-	R	≥0	y	y	TO deleted automatically because manual intervention
14093	203	NP	-	R	≥0	n[106]	n[106]	Data manipulation not possible
14100	41	NA	General	S	≥0	y	y	General syntax error (tel. length wrong, …)
14101	-	NA	Header	S	≥0	y	y	Telegram sender ID wrong
14102	60	NA		S	≥0	y	y	Telegram receiver ID wrong (Order not for this SOC)
14103	-	NA		S	≥0	y	y	Not supported telegram sub type
14104	-	NA		S	≥0	y	y	Not supported version
14105	-	NA		S	≥0	y	y	Movement options wrong
14120	-	NA	LHD	S	≥0	n	n	SRM location: wrong orbiter number
14121	-	NA		S	≥0	y	y	SRM extern location: wrong aisle number
14122	61/64	NA		S	≥0	n	y	SRM extern location: wrong X-coordinate
14123	62/65	NA		S	≥0	y	y	SRM extern location: wrong Y-coordinate
14124	63/66	NA		S	≥0	y	y	SRM extern location: wrong S-coordinate
14125	63/66	NA		S	≥0	y	y	SRM extern location: wrong D-coordinate
14126	70	NA		S	≥0	y	y	SRM intern location: wrong SRM number
14127	-	NA		S	≥0	y	y	SRM intern location: wrong LHD number
14128	-	NA		S	≥0	n	n	SRM intern location: wrong “Place on LHD” number
14129	84/85	NA		S	≥0	y	y	Amount of TUs wrong (range)
14130	42	NA		S	≥0	y	y	Order code wrong
14131	-	NA		S	≥1	y	y	Order extension 1 wrong
14132	-	NA		*S*	*≥1*	*n*	*n*	*Order extension 2 wrong*
14134	4	NA		S	≥0	n	y	Order not accepted because error in another TO part
14135	-	NA		S	≥0	y	y	Acknowledge or acknowledge extension not 0
14136	-	NA		S	≥1	y	y	SRM intern location: wrong "Finger activation" or “Grip-

[111] For the meaning of abbreviations please refer to IF SOC General, chapter 4.1.4.

[112] **S**yntax or **R**untime

Acknowledge Code	Comparable old OS2 code	Ack. Type[111]	Scope of telegram check	Check time[112]	Feature in version	NG1020V[103]	NG2020V[103]	Description
								per opening width" value
14141	-	NA	TU	S	≥0	n	n	TU type wrong
14142	-	*NA*		*S*	-	*n*	*n*	*TU Type flags 1 wrong*
14143	-	*NA*		*S*	-	*n*	*n*	*TU Type flags 2 wrong*
14144	69	NA		S	≥0	y	y	TU type: wrong length/depth
14145	68	NA		S	≥0	y	y	TU type: wrong width
14146	67	NA		S	≥0	n[113]	n[113]	TU type: wrong height
14147	-	NA		S	≥0	n	n	TU type: wrong weight
14160	70	NA	TO	S	≥0	n	n	General plausibility error
14161	71+72	NA		S	≥0	n[113]	n[113]	SRM external location is in a blocked area
14162	75	NA		S	≥0	n	n	SRM external location: Length/depth doesn't fit
14163	74	NA		S	≥0	n	n	SRM external location: Width doesn't fit
14164	73	NA		S	≥0	n	n	SRM external location: Height doesn't fit
14165	76	NA		S	≥0	n	n	SRM external location: Weight doesn't fit
14166	-	NA		S	≥0	n	n	SRM external location: TU type doesn't fit
14167		NM		S	≥1	n	n	SRM external location: Grid error (conflict between X-coordinate, TU dimension and/or rack shelf type setting)
14171	88/89	NA		S	≥0	y	(y)	Data integrity: SRM external location is misused; "Type of extern location" out of range[114]
14172	(86/87)	NA		S	≥0	n	y	Data integrity: SRM external location in at least 2 TO parts doesn't fit for combined TO execution
14173	-	NA		S	≥0	n	n	SRM external location: TU type mismatch[115]
14174	-	NA		S	≥0	n	n	SRM internal location: TU type mismatch[115]
14175	-	NA		S	≥1	y	y	Data integrity: TUs with different WCs could not be moved together (C-Grip rule 3)
14200	81	NA2	internal	R	≥0	y	y	Buffer full
14201	-	NA2		R	≥0	n	n	General runtime error
14211	101	NM	Rack	R	≥0	n	n	Rack location occupied
14212	102	NM		R	≥0	n	n	Rack location empty (detection before fork cycle)
14213	113+114	NM		R	≥0	n	n	Rack location blocked
14214	121+122	NM		R	≥0	n	n	Rack location is currently not available
14215	115	NM		R	≥0	n	n	Storage: gap will exist after execution of this TO
14216	117	NM		R	≥0	n	n	Clearance error SRM telescopic arms
14217	*14213*	*NM*		*R*	*≥0*	*n*	*n*	*Rack location occupied with different TU type than in TO (get)*
14218	-	NM		R	≥1	y	y	C-Grip: expected gap between TUs in depth direction not found
14219		TP2		R	≥1	y	y	Rack location empty (detection after fork cycle)
14231	111	NM	Transfer	R	≥0	y	n	Storage signal from CS is missing
14232	112	NM		R	≥0	y	n	Retrieval signal from CS is missing
14233	118	NM		R	≥2	y	n	Storage not possible, TS is empty
14234	119	NM		R	≥2	y	n	Retrieval not possible, TR is not empty
14235	123	NM		R	≥0	n	n	Storage: Transfer location disturbed
14236	124	NM		R	≥0	n	n	Retrieval: Transfer location disturbed
14237	*125*	*?*		*R*	*-*	*n*	*n*	*Storage (get TU from CS) failed (N)*
14238	*126*	*?*		*R*	*-*	*n*	*n*	*Retrieval (put TU onto CS) failed (N)*
14239	*129*	*NM*		*R*	*-*	*n*	*n*	*Storage not possible, TS blocked by other TU (N)*
14240	*130*	*NM*		*R*	*-*	*n*	*n*	*Retrieval not possible, TR blocked by other TU (N)*

[113] Wished by IT, not planned by SI because too much effort

[114] additional for Navette V2

[115] Used only, if more than one TU type used for this SRM

Acknowledge Code	Comparable old OS2 code	Ack. Type[111]	Scope of telegram check	Check time[112]	Feature in version	NG1020V[103]	NG2020V[103]	Description
14251	127	NM		R	≥0	y[116]	n	Storage: Not enough TUs on TS to fulfill this TO
14252	128	NM		R	≥0	n	n	Storage: More TUs on TS than in SRM get order
14253	33	NM		R	≥0	y[116]	n	TU-ID mismatch
14254	-	NM		R	≥0	n	n	TU-Type mismatch
14271	82	NM	LHD	R	≥0	y	y	Wrong LHD occupancy: the fork is empty
14272	84	NM		R	≥0	y	y	Wrong LHD occupancy: not enough TUs on fork to fulfill TO
14273	85 (83)	NM		R	≥0	y	y	Wrong LHD occupancy: too many TUs on fork to fulfill TO
14274	116	TP2		R	≥0	y	n[117]	Unclear LHD occupancy: difference between current and nominal value
14275	-	NA2		R	≥0	n	y	LHD disabled
14276	-	NM		R	≥1	n	n	Get not possible: WC of TU on LHD is larger than WC of TU to be taken over (according TO; C-Grip rule 1)
14277	-	NM		R	≥1	n	n	Put not possible: There is a TU on the LHD with a larger WC than the TU in the put order (C-Grip rule 2)
14278	-	TP2		R	≥2	y	y	Get order not fully successful (less TUs on fork than expected)
14279	-	NM		R	≥2	y	y	Get not possible: WC of TU on LHD is different than WC of TU to be taken over (according TO)
14281	42	NA2	TO	R	≥0	y	y	Order code wrong: FO expected (SRM is still waiting for following up order)
14282	42	NA2		R	≥0	y	y	Order code wrong: TO expected (SRM was waiting for a normal order, but now for an FO)
14283	-	NA2		R	≥1	y	y	Order code wrong: different OC expected in this situa-tion
14291	(103-105)	TP1	TU	R	≥0	n	n	TU contour enlargement detected (get)
14292	(103-105)	NM		R	≥0	n	n	TU contour doesn't fit for destination (put)
14293	-	TP1		R	≥0	n	n	TU type change detected (get)
14294	-	*NM*		*R*	*≥0*	*n*	*n*	*TU type doesn't fit for destination (put)*
14295	-	NM		R	≥0	n	n	TU type mismatch between TO and LHD (put)
14296	-	NM		R	≥1	y	y	TU contour on LHD different to TU contour data in TO (put)
14297	2	TP3		R	≥0	n	n	Deviating transport completion
14298	-	NM		R	≥1	n	n	TU on other LHD prevent TO execution
14299	-	NM		R	≥1	n	n	{* TU not in correct position on fork for put order (z-direction) *}
14301	-	*NM*	Environ.	*R*		*n*	*n*	*Reserved for SCP Lift*
14302	91+92	NM		R	≥0	n	y	SRM collision possible (special for Kempf and Navette: both SRMs have an TO)
14303	-	NM		R	≥1	n	y	(SRM collision possible (special for Kempf and Navette: only this SRM had an TO)
				R				Orbiter still busy (>20s)
								Orbiter dead
								Orbiter battery status to low

[116] For projects with underlayed filed bus communication Navette-Lift <-> BinCS; Not for projects with data light barrier (Migros)

[117] Because fork clearing not possible for Gripper Navette

4.3.1.6.6.2 Acknowledge Extension 1

Bit	FiV	NG1020V[103]	NG2020V[103]	Description
0	≥1	n	n	Orbiter AC14213: foil assumed; disable this detection by setting OE1.5 (see 4.3.1.6.5.2)
1	≥2	y	y	Gripper Navette: place 1 occupied
2	≥2	y	y	Gripper Navette: place 2 occupied
3	≥2	n	n	*Gripper Navette: place 3 occupied*
4	≥2	n	n	*Gripper Navette: place 4 occupied*
5				
6				
7				

4.3.1.6.6.3 Acknowledge Extension 2

4.3.1.6.6.3.1 Usage for AC14211 and 14212

Value	FiV	U	Description
0	≥0	y	void (field not used for this acknowledge code)
1 … max. depth	≥0	y	maximal detected depth causing the storage / retrieval problem

4.3.1.6.6.3.2 Usage for stocktaking order (OC 14041 or 14042)

Note: value 0 is used only, if there is not rack occupancy sensors installed. If so, values 1 -3 are not relevant.

Value	*FiV*	*U*	*Description*
0	*≥1*	*n*	*rack occupancy check disabled*
1	*≥1*	*y*	*rack empty*
2	*≥1*	*y*	*rack occupied*
3	*≥1*	*y*	*rack blocked, occupancy unknown*

4.3.1.6.6.3.3 Usage for Navette and Navette Lift in case of order deletion (AC14092)

Navette and Navette Lift will indicate the device error causing the error mode in the TO deletion telegram by setting the AC2 value to the error code.

Value	*FiV*	*U*	*Description*
0	*≥1*	*y*	*void (field not used for this acknowledge code)*
1 … 255	*≥1*	*y*	*Error code according current Navette error list. See* Generic IF SOC for SRM (TT14xx), chapter 1.3, “Navette Type 1 Error Messages”

4.3.1.6.6.3.4 Usage for “Get order not fully successful (less TUs on fork than expected)“ (AC14278)

Gripper Navette and Gripper Navette Lift will indicate the device error causing the error mode in the TO deletion telegram by setting the AC2 value to the error code.

Value	FiV	U	Description
0	≥1	y	gripper opening width: unclear
18 … 68	≥1	y	gripper opening width [10 mm]

4.3.1.6.6.3.5 AE2: Usage for C-Gripper in case of clearance error telescopic arms (AC14216)

This section is currently (March 2014) relevant for M&S only!

Note: TA stands for telescopic arm.
TA1 and 2 numbering: see chapter Generic IF SOC for SRM (TT14xx), chapter 5.4.4.7.1.

Bit	FiV	U	Description
0	≥1	y	A: Gap TA1 too narrow no possibility to drive TA 1 into the gap in x direction
1	≥1	y	B: Gap TA2 too narrow no possibility to drive TA 2 into the gap in x direction
2	≥1	y	C: TU shifted too much in x-direction Get/Put: real x position deviates too much from nominal position)
3	≥1	y	D: TU too wide • Get/Put: TU of higher WC in the rack or twisted • rack clearing: No possibility to take out TU
4	≥1	y	E: Neighbor TU too close to TA1 • Get: Outer Sensor TA1 shows occupancy, not possible to drive away that much from Neighbor • Put: Outer Sensor TA1 shows occupancy
5	≥1	y	F: Neighbor TU too close to TA2 • Get: Outer Sensor TA2 shows occupancy, not possible to drive away that much from Neighbor • Put: Outer Sensor TA2 shows occupancy
6			
7			

For possible MFS reactions please refer to Generic IF SOC for SRM (TT14xx), chapter 5.4.4.7.2.

4.3.1.7 Description of the Fields – Part TU

This telegram part will be used by other SOC types too. Please refer to chapter 4.1.3.

SRM may update any of these fields in chase of this acknowledge codes:
14291: TU contour enlargement detected (get)
14293: TU type change detected (get)

SRM must not check the TU error flags to be 0. MFS may have the need to move error TUs via the SRM to a NOK, or to move a TU with an error, recognized by the SRM, from the fork.

For forks with more than one TU on it:
The TU stripes are filled by the order of take over the TUs onto the fork respectively unload the TUs off the fork: 1st TU is in TU stripe 1. See Generic IF SOC for SRM (TT14xx), chapter 6.2.2.3 for an example.

Notes to OC14031, 14032, 14021, 14042:
Fork type xxxx: Setting of TU data detail information is not needed.
Fork type yyyy: Setting of TU data detail information is not needed.

Only template: was temporarily used for Nike; remove next section if not relevant in project specific IFSOC.