APPENDIX
FOLD AND INSERTING MACHINE SI 76

OPTICAL MARK READING

OPERATOR MANUAL

1. FUNCTION

The SI 76 fold and inserting machine can be equipped with Optical Mark Reading. With this option the system reads optical marks that have been specially printed on the documents. This code contains information about the processing of the documents.

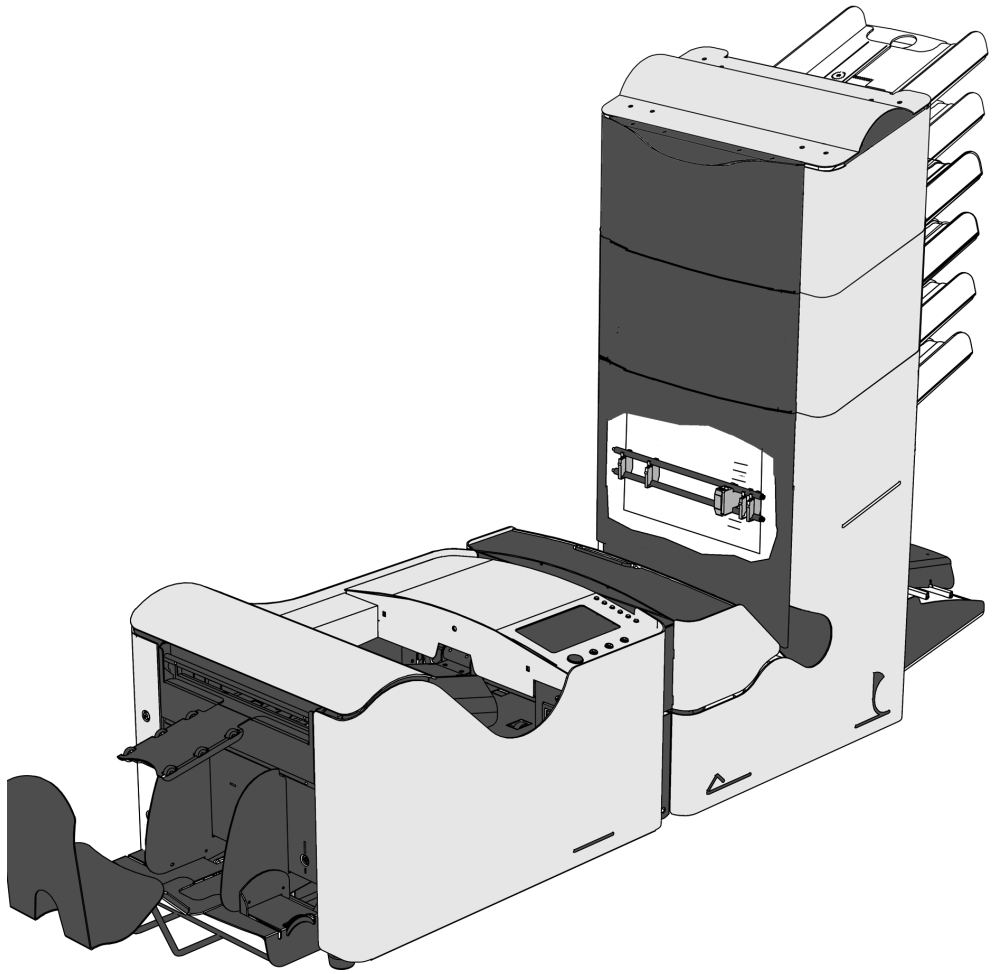


Fig. 1

CONTENTS

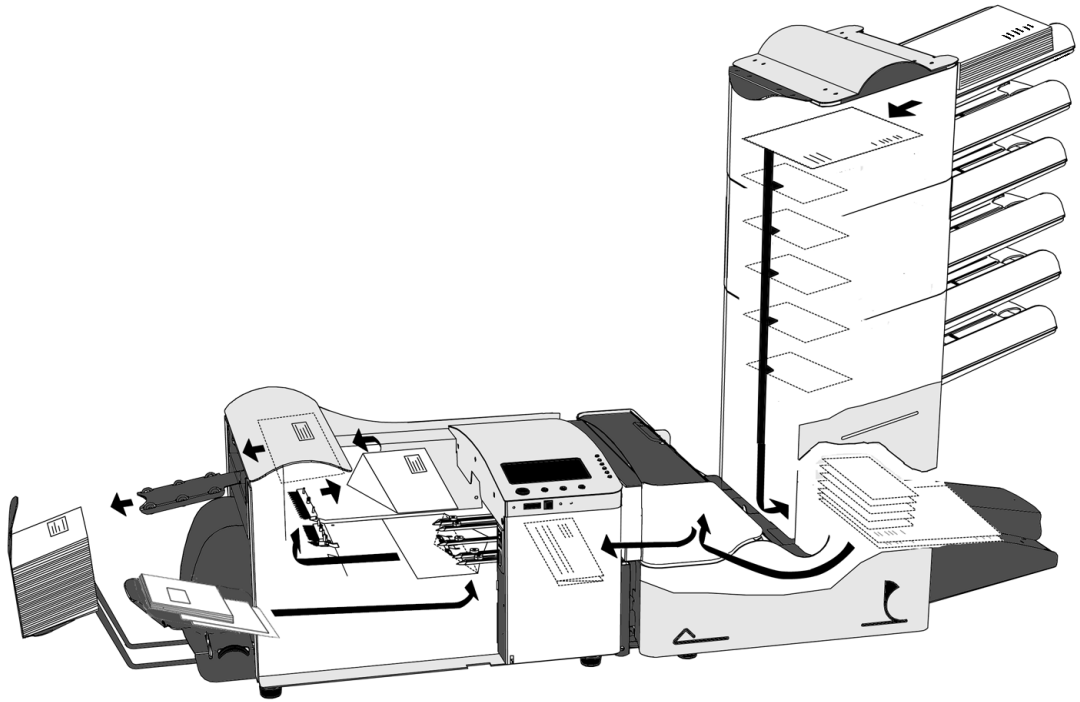


Fig. 2

Note: This manual describes the additional functions of the SI 76 and necessary adjustments when equipped with the OMR-function. Use this manual in combination with the operator manual SI 76.

2. GENERAL

2.1 Processing documents with OMR

The SI 76 fold and inserting machine can be equipped with optical mark reading (OMR). With OMR documents can be processed according to the printed code on the documents.

The documents with the printed reading code are placed in the feeder which has been selected as the "reading" feeder.
Depending on the programmed code the other feeders can be used as selective feeders. This means documents can be fed selective. In this way different sets can be processed.

At first the documents (incl. the address carrier) with the printed codes are accumulated. The selective enclosures are accumulated after the last document of a set, with a reading code, is fed.

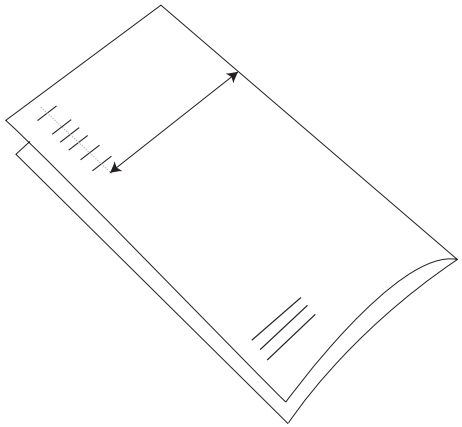


Fig. 3

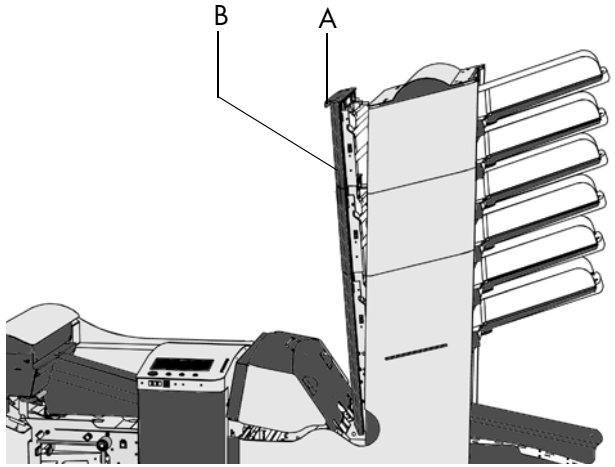


Fig. 4

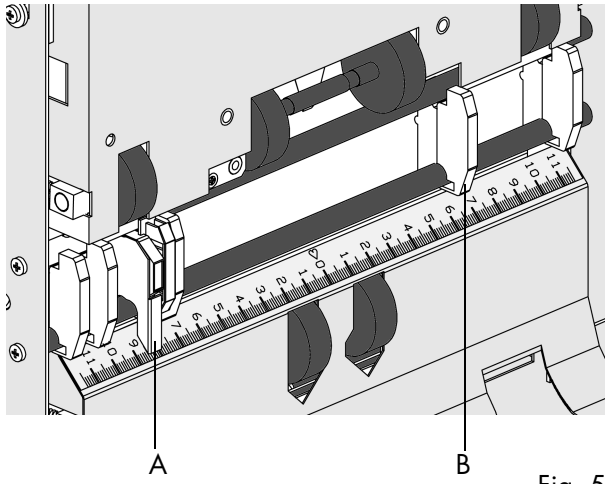


Fig. 5

3. ADJUSTMENTS

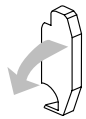
3.1 Reading head position

The reading head must be placed according to the (horizontal) position of the printed marks on the documents. To adjust the reading head, proceed as follows:

- take a template document with a reading code.
- fold the document double on the middle line as shown in fig. 3.
- measure the width from the middle of the document to the middle of the marks.
- pull the hand grip A (fig. 4) upward to open the vertical transport cover B (fig. 4).
- adjust the reading head A (fig. 5) according to the measured width.
- divide the paper guides B along the width of the document.

When the reading head is adjusted it is possible that some paper guides have to be removed and replaced on the other side of the reading head.

Remove a paper guide as follows:



turn the paper guide until it comes free from axles.

pull the paper guide out of the machine.

The replacement procedure is the reversal of the removal procedure.

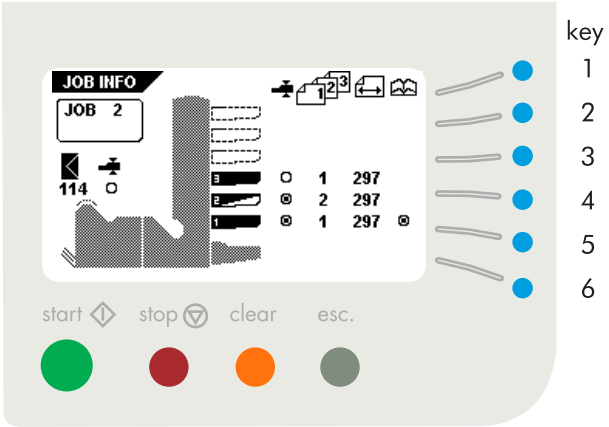


Fig. 6

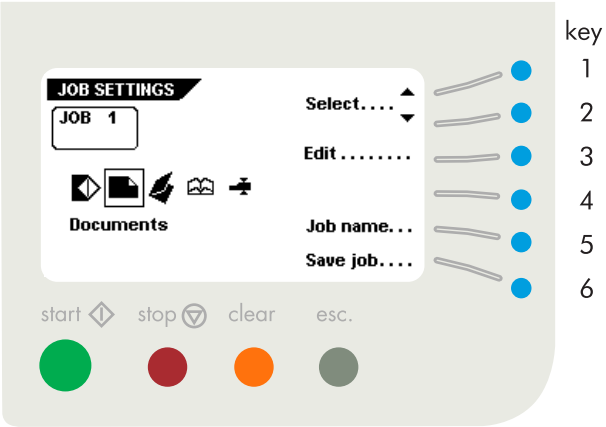


Fig. 7

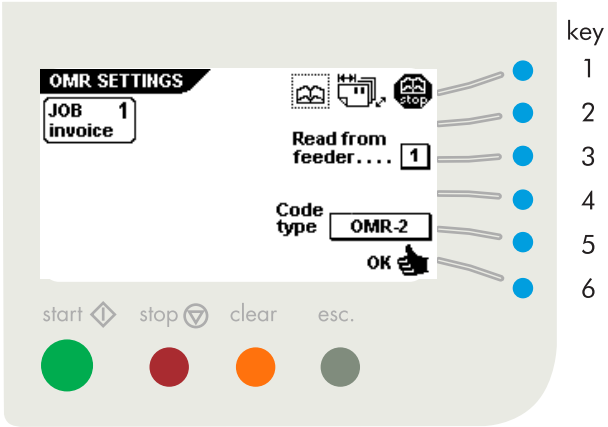


Fig. 8

4. JOB INFO

4.1 The job info screen

When key 1 is pressed in a menu, the job info screen will be displayed. When the SI 76 is equipped with OMR, the job info screen also shows on which feeder OMR is activated. A similar screen is shown in fig. 6. The OMR function is indicated by an symbol.

The symbol indicates that the feeder is selected as a active selective feeding station. The symbol indicates that the feeder is an inactive selective feeding station.

5. JOB SETTINGS

5.1 The job settings menu

When "new job" or "edit job" is selected, the job settings menu is displayed. When the SI 76 is equipped with OMR, the "job settings" menu is provided with an additional settings menu indicated by the symbol as shown in fig. 7.

When OMR is selected, the amount of documents in the "document settings" menu is not displayed anymore. Instead the is displayed. The amount of documents of the "reading feeder" is set to 1.

A selective feeder will be activated when the amount of documents is set to one or higher and the sheet length is set in the "document settings" menu. See also page 18 of the SI 76 operator manual.

5.2 The OMR settings

When the "OMR settings" menu is selected (with key 1 or 2 and key 3 to edit (fig. 7), the screen as shown in fig. 8 is displayed. The following choices are available:

- go to the OMR position settings screen (key 1);
- select the feeder to read from (key 3) (depending on the selected code type, a feeder can be selected as reading feeder);
- select the needed reading code (key 5);
- confirm settings by pressing "OK" (key 6) which will get you back to the "job settings" menu.

When OMR is switched on and the settings are confirmed with OK, the DFC of the inserter is automatically switched off.
When required the DFC can be set to on again in the "DFC settings" menu. Also the daily mail of the upper feeder is switched off and the amount of documents is set to 1.

The highest output speed will be obtained when feeder 1 has been selected as "reading feeder".

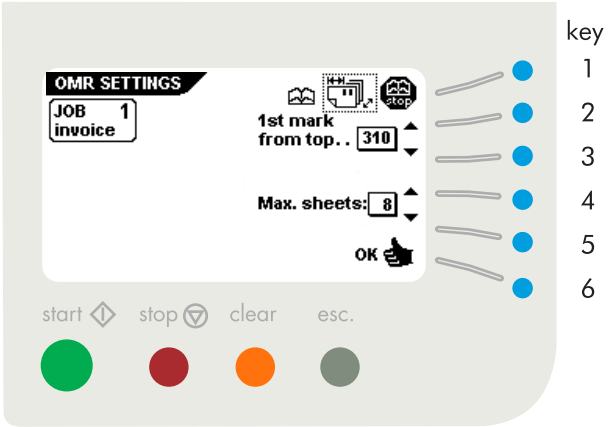


Fig. 9

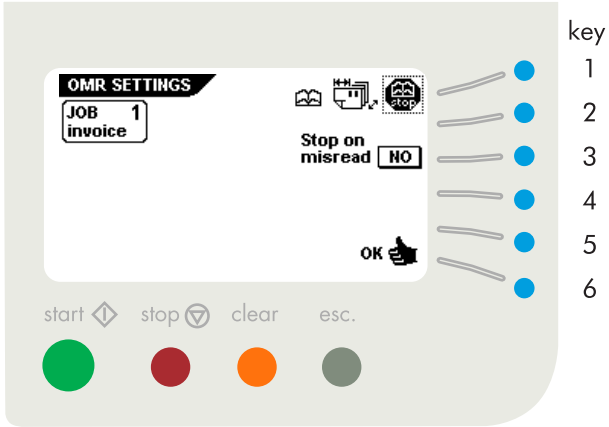


Fig. 10

5.3 The OMR position

When the OMR position is selected the display shows the screen as shown in fig. 9. The following choices are available:

- go to the "Stop on misread" position settings screen (key 1);
- select the position of the first optical mark, measured from the top of the sheet (key 2 and 3);
- select the maximum amount of sheets in the set of documents (key 4 and 5);
- confirm settings by pressing "OK" (key 6) which will get you back to the "job settings" menu.

The maximum amount of sheets in a set is 25.
When the amount of sheets is above 8 the documents can not be folded. Therefore the maximum length of the documents can be 148 mm (5.8 inch). Be sure that in the used job the fold type is set to "no fold" (see SI 76 operator manual page 20). Otherwise document stoppages will occur and the system stops.

When the max. sheets counter is exceeded the machine will accumulate until it reads an insert mark, divert mark or a number of 26 sheets. This set or part of a set will be diverted and error code 3:130 is generated. By pressing the reset key the machine will start and will repeat this process until an insert or divert mark is found.

5.4 The "stop on OMR Fault"

When the "Stop on misread" settings is selected the display shows the screen as shown in fig. 10. The following choices are available:

- go to the "select OMR" settings screen (key 1);
- select stop yes or no after an optical mark misread (key 3);
- confirm settings by pressing "OK" (key 6) which will get you back to the "job settings" menu.

When stop on OMR misread is set to "YES", the machine stops after detecting an OMR misreading. The incorrect set is thrown out by the IntelliDeck™. After resetting the machine, the next document set is also diverted and the system starts processing again.

The diverted set(s) should be checked by the operator.
When stop on OMR misread is set to "NO" the machine does not stop after detecting an OMR misreading. The incorrect set is thrown out by the IntelliDeck™. The next set is also diverted and then the machine starts processing again. After detecting 5 OMR misreadings in a row, the system stops.

5.5 Linking of feeders

5.5.1 Linking of reading feeders

When two feeders are linked and used as reading feeders, you need to use sequence check for a good level of security. When this is done make sure that the feeders are (re)filled in the correct order (feeder 1 first) to prevent sequence errors.

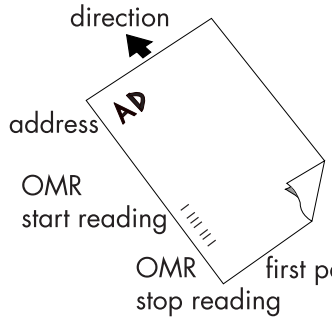
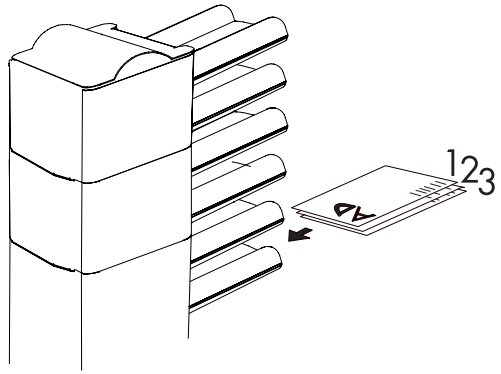
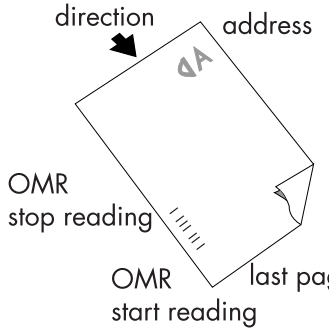
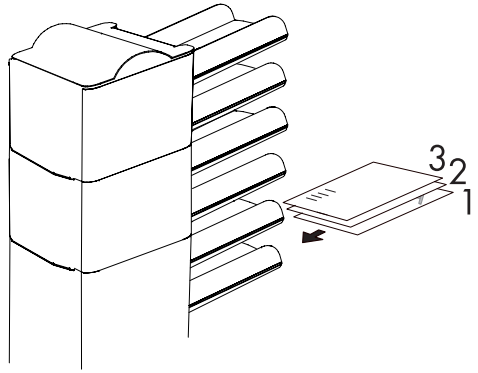
In addition to this make sure that complete sets are loaded in every reading feeder. Should it inadvertently happen that a document set is divided between the two feeders, the system will display error (4:, 5:, 6:, 7:) 15 which means that the set is incomplete. Refer to section 7.1 for further details regarding this error.

5.5.2 Removed/reselecting links

When editing a "reading" job or when switching on the reading, the system will check the configuration for links which are not possible with the selected reading code. In that case all links in this job will be removed. Necessary links have to be selected again. **It is advised to check in the document settings menu if the required links are still present.**

5.6 Feeding documents

The documents with the OMR codes must be fed as shown in the table below.

Fold type		Type of documents	
 no fold	 single fold		 Address carrier, face up and leading.
 letter fold	 double parallel fold		
 zig-zag fold		(duplex printed) 	 Address carrier, face down and trailing.

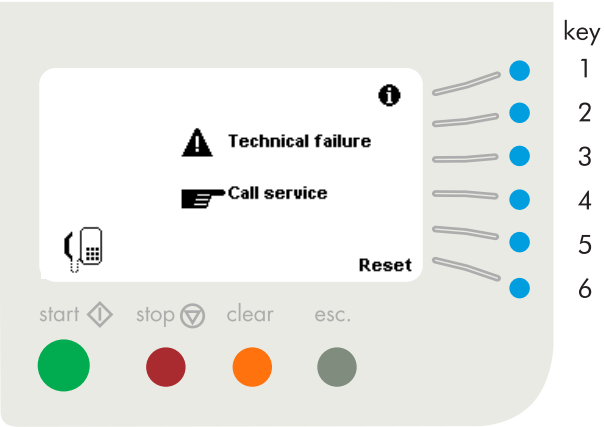


Fig. 11

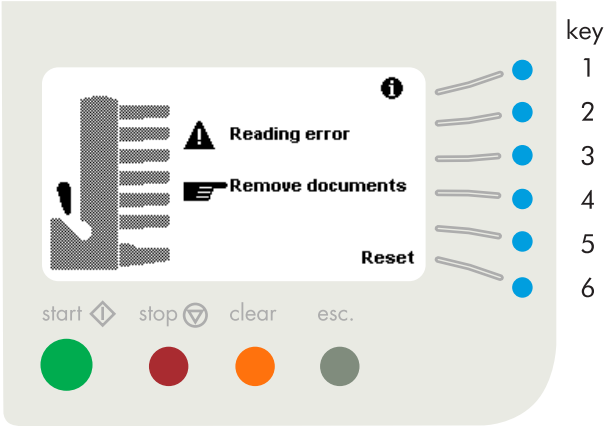


Fig. 12

6. FAULT FINDING

6.1 General

When the SI 76 system is equipped with OMR, the following error types are possible:

- technical errors;
- paperflow errors;
- double thickness measurement errors;
- reading errors.

When a technical error occurs, the display shows a screen as shown in fig. 11. This technical error of the reading system can not be solved by operating personnel. Contact your dealer for technical assistance.
When a technical error occurs, the reading will be switched off. The system will operate but without reading capabilities.

For the general paperflow errors, refer to the SI 76 operator manual.
Reset the machine by pressing key 6. Press key 1 to show more information about the occurred error.

6.2 Reading and double document detection errors

When a reading or double document thickness detection error occurs, the document set is diverted. Depending on the job settings the system stops or not.
When the system stops, the display shows an error screen similar as shown in fig. 12. After resetting the system, it can be restarted with the start key. The system will divert documents until the last document of the set is diverted. Then the system starts operating in normal mode again.
If the system does not stop, the system will divert documents until the last document of the set is diverted.

6.3 Paperflow error with reading on

When a paperflow error with optical mark reading "on" occurs, the system stops. The involved documents have to be removed from the machine manually. The display shows an error screen which indicates the position of the occurred stoppage position. After resetting the machine, it can be started again by pressing the start key. The machine diverts documents until the last document of the set is detected.

7. ERROR CODES

7.1 General error codes

error description	suggested solution	see also....	information	Error code	Description
Reading error.	Remove documents.			3 : 111	Remove the documents and complete the diverted set manually.
Reading error.	Remove documents.	Page 5.	Wrong window position.	3 : 112	Remove the documents and adjust the 1st mark from the top position correctly.
Reading stop.	Remove documents.		Stop mark read.	3 : 113	Remove the documents and complete the diverted set manually.
Reading error.	Remove documents.	Pages 4 and 5.	Not enough marks.	3 : 120	Remove the documents and adjust the reading head. Adjust the1st mark from the top position correctly. When the error still occurs, contact your service organization.
Reading error.	Remove documents.	Page 10.	Mulitple basic command.	3 : 121	Remove the documents and check the used OMR code.
Reading error.	Remove documents.	Page 10.	Sequence error.	3 : 124	Remove the documents. Check the set and the used OMR code. Replace the set in the feeder or complete the set manually.
Reading error.	Remove documents.	Pages 4 and 10.	Wrong parity in code.	3 : 126	Remove the documents and check the used OMR code. Adjust the reading head.
Reading error.	Remove documents.	Page 10.	Wrong mark distance.	3 : 128	Remove the documents and check the used OMR code's (mark line distance).
Reading error.	Remove documents.		To many sheets in set.	3 : 130	Remove the documents and complete the set manually.
Incomplete set.	Load documents.		Empty feeder.	4:, 5:, 6:, 7 : 15	Reload the remainder of the set into the reading feeder. Press "reset" to remove the error message and press "start" to resume operation.

Service assistance is needed for the error codes with the message "technical failure".
Write down the error code and then switch the inserter off and on again to verify machine operation. When the error still occurs contact your service organisation.

7.2 Flexible reading error codes

error description	suggested solution	see also....	information	Error code	Description
Reading error.	Remove documents.	Page 10.	No basic command.	3 : 122	Remove the documents and check the used OMR code (flex-dongle).
Reading error.	Remove documents.	Page 10.	Matching error.	3 : 123	Matching error within a set. Remove the documents, check the matched number and replace the set in the feeder or complete the set manually.
Reading error.	Remove documents.	Page 10.	Matching error.	3 : 125	Matching code compared to the previous matching code incorrect. Remove the documents, check the matched number and replace the set in the feeder or complete the set manually.
Reading error.	Remove documents.	Page 10.	Undefined mark found.	3 : 127	Remove the documents and check the used OMR code (flex-dongle).
Reading error.	Remove documents.	Page 10.	Too many marls.	3 : 129	Remove the documents and check the used OMR code (flex-dongle).

Service assistance is needed for the error codes with the message “technical failure”.
Write down the error code and then switch the inserter off and on again to verify machine operation. When the error still occurs contact your service organisation.

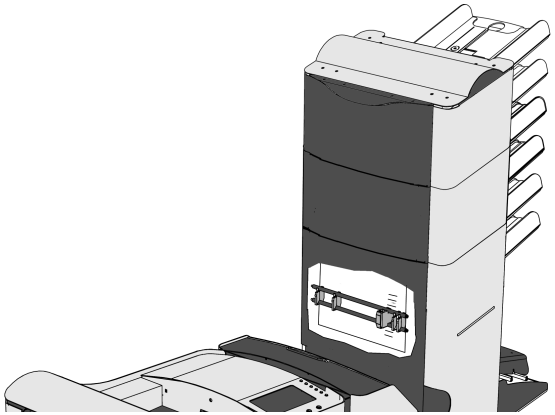


Fig. 13

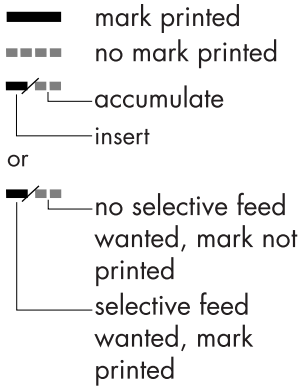


Fig. 14

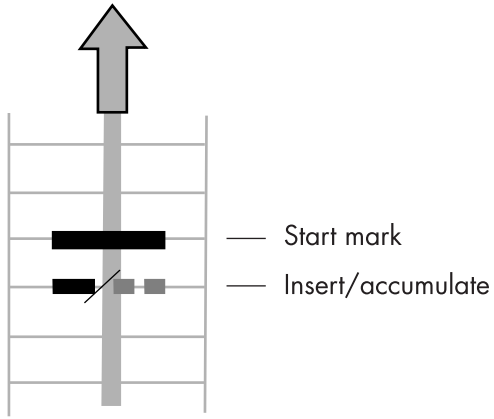


Fig. 15

8. OMR CODE

8.1 Function

In order to handle computer printed documents fully automatically, code marks are printed on each document. The system controls if the documents for the same address are accumulated and then inserted.

The first sheet of a set always contains the address which will appear behind the window of the envelope. Depending on the installed options, a full length code is printed on every sheet of a set.

The code on the last sheet of the set contains the information of what to do with the set. On this sheet all the desired instructions must be print. If a parity check or sequence check is used, this is checked on each sheet. If the set contains only one sheet, it is the "last" sheet.
The code must appear in the same location on every page regardless of the actual code length.

8.2 Legend

In fig. 14 the legend for the used symbols in the following figures is shown.

8.3 Printing Quality

- Marks should be printed in black.
- Marks on the same sheet must have equal intensity.
- For matrix printers near letter quality (NLQ) printed characters are preferred to obtain maximum blackness (double strike).
- Be aware of background "noise": this could be color changes on the form, background design, a logo or copy on the opposite side of the sheet that will bleed through and be read by the reading head.
- The ribbon or toner quality must be checked.
- Printing must be done on the same position on every sheet.

8.4 Minimum code/basic commands

The minimum code is two marks (one mark is possible for the USA, only the accumulate/insert mark is printed or not). It is printed two lines in one track. The first line (fig. 15) is the start mark.
If a mark is printed on the second line it means insert, if no mark is printed in this position it means accumulate.

In some cases, on request of the customer, the reading of the basic commands can be set reversed by the service organisation. This means that for the insert command no mark has to be printed and for the accumulate command a mark has to be printed.

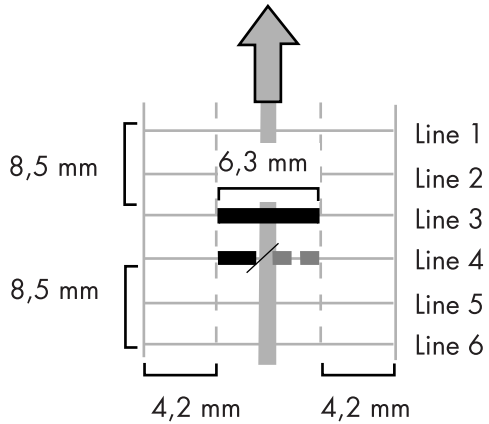


Fig. 16

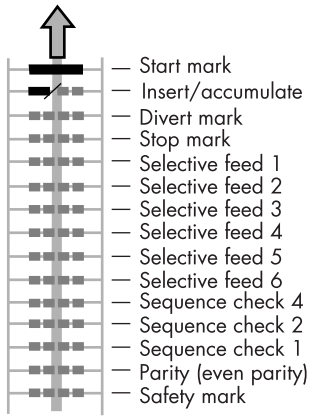


Fig. 17

8.5 Reading code

8.5.1 Position of the code

The code must be printed minimally 15 mm (0.59 inch) away from the top and 20 mm (0.79 inch) from the bottom of the sheet. Note that in the OMR settings menu default the first mark from the top is set to 100 mm (3.9 inch). From the left and right hand side of the sheet 7 mm (0.28 inch) must be kept clear. The code must appear in the same location and have a consistent number of lines on every page.

8.5.2 Free area around the code

At the left and right hand side of the mark 4,2 mm (0.17 inch) must be kept clear. Above the first mark and under the last mark a space of 8,5 mm (0.33 inch) must be kept clear. This space is similar to two lines printed at 1/6 inch line distance.
This means that the minimum code area consists of 4 lines, printed at 1/6 inch line distance, plus 2 lines to print the (basic) code = 6 lines. See also fig. 16.
Line distance may be 2,54 mm (1/10 inch) to 6,3 mm (1/4 inch).

Note: for each additional mark one additional line is necessary.

8.5.3 Code width, character space and pitch

The minimum width of the code area is 7 character spaces. From left to right: first 2 characters space unprinted (4,2 mm; 0.16 inch), then the track mark (3 characters or 6,3 mm; 1/4 inch) and finally 2 character spaces unprinted. Pitch 10 or 12 is accepted
The track mark can be printed by using the "underline" sign (_).

8.6 Additional marks

When it is necessary to control more functions in the inserter system, the use of more marks than in the minimum code is needed (see fig. 17).

At the moment the following additional functions are possible via software options (see fig. 17):

- Divert mark (divert & continue)
- Stop mark (divert & stop)
- 1 mark: selective feed from station 1
- 1 mark: selective feed from station 2
- 1 mark: selective feed from station 3
- 1 mark: selective feed from station 4
- 1 mark: selective feed from station 5
- 1 mark: selective feed from station 6
- 1, 2 or 3 marks: resp. sequence check 4, 2 and 1
- 1 mark: parity check (even)
- 1 mark: safety mark

It is possible to choose a code containing 2, 3, 4, 5, 6, 7, 8, 9,10, 11, 12, 13 or 14 marks, provided:

- the marks chosen are used in the above sequence,
- if a function is not used the following function will move upwards one line with each suppressed function,
- the chosen code is used on all material which will be processed by the optical mark reading (the length of the code and the meaning of a mark is a service setting).

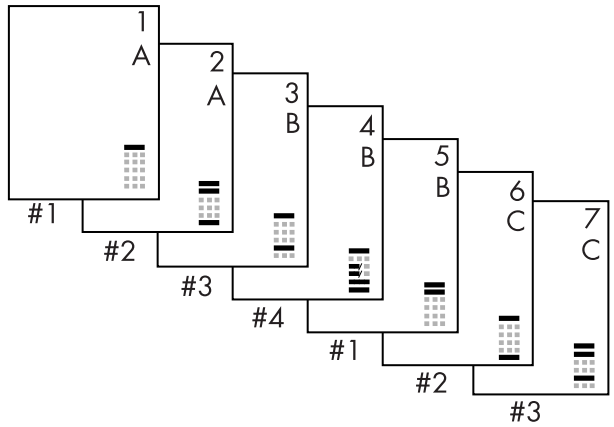


Fig. 18

8.6.1 Divert & continue

When the "divert & continue" mark is printed, special sets will be sorted and diverted.
The system does not stop processing.
Divert & continue is only executed together with accumulate.

8.6.2 Divert & stop

When the "divert & stop" mark is printed also special sets will be sorted and diverted, however in this case the system will stop.
Divert & stop is only executed together with accumulate.

8.6.3 Selective feed mark

When one or more selective feed marks have been printed, the system knows from which station an enclosure has to be added to the set.

8.6.4 Sequence check

Sheets in a stack can accidentally get out of sequence or can be missing. This can be detected by the SI 76 in case each sheet has a number that forms part of the reading code.
These are the available possibilities:

- pages are numbered 1-2-1-2-1-etc.
  This requires one additional sequence mark.
- pages are numbered 1-2-3-4-1-2-3-4-1-2-etc.
  This requires two additional sequence marks (see fig. 18).
- pages are numbered 1-2-3-4-5-6-7-8-1-2-3-etc.
  This requires three additional sequence marks.

Pages numbered 1-2-1-2-1-etc., one sequence mark used (first sequence check position)

sheet 1: no mark printed sequence check 1 ▭

sheet 2: a mark printed sequence 1 ▬

sheet 3: no mark printed sequence check 1 ▭

etc.

Pages numbered 1-2-3-4-1-2-etc., two marks used (first and second sequence check position)

sheet 1: no mark printed sequence check 2 ▭
no mark printed sequence check 1 ▭

sheet 2: no mark printed sequence check 2 ▭
a mark printed sequence check 1 ▬

sheet 3: a mark printed sequence check 2 ▬
no mark printed sequence check 1 ▭

sheet 4: a mark printed sequence check 2 ▬
a mark printed sequence check 1 ▬

etc.

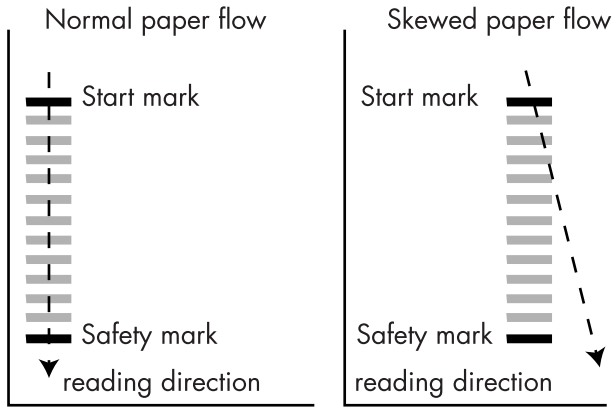


Fig. 19

Pages numbered 1-2-3-4-5-6-7-8-1-2-etc., three marks used (first, second and third sequence check position)

sheet 1: no mark printed sequence check 4
no mark printed sequence check 2
no mark printed sequence check 1

sheet 2: no mark printed sequence check 4
no mark printed sequence check 2
a mark printed sequence check 1

sheet 3: no mark printed sequence check 4
a mark printed sequence check 2
no mark printed sequence check 1

sheet 4: no mark printed sequence check 4
a mark printed sequence check 2
a mark printed sequence check 1

sheet 5: a mark printed sequence check 4
no mark printed sequence check 2
no mark printed sequence check 1

sheet 6: a mark printed sequence check 4
no mark printed sequence check 2
a mark printed sequence check 1

sheet 7: a mark printed sequence check 4
a mark printed sequence check 2
no mark printed sequence check 1

sheet 8: a mark printed sequence check 4
a mark printed sequence check 2
a mark printed sequence check 1

etc.

8.6.5 Parity mark

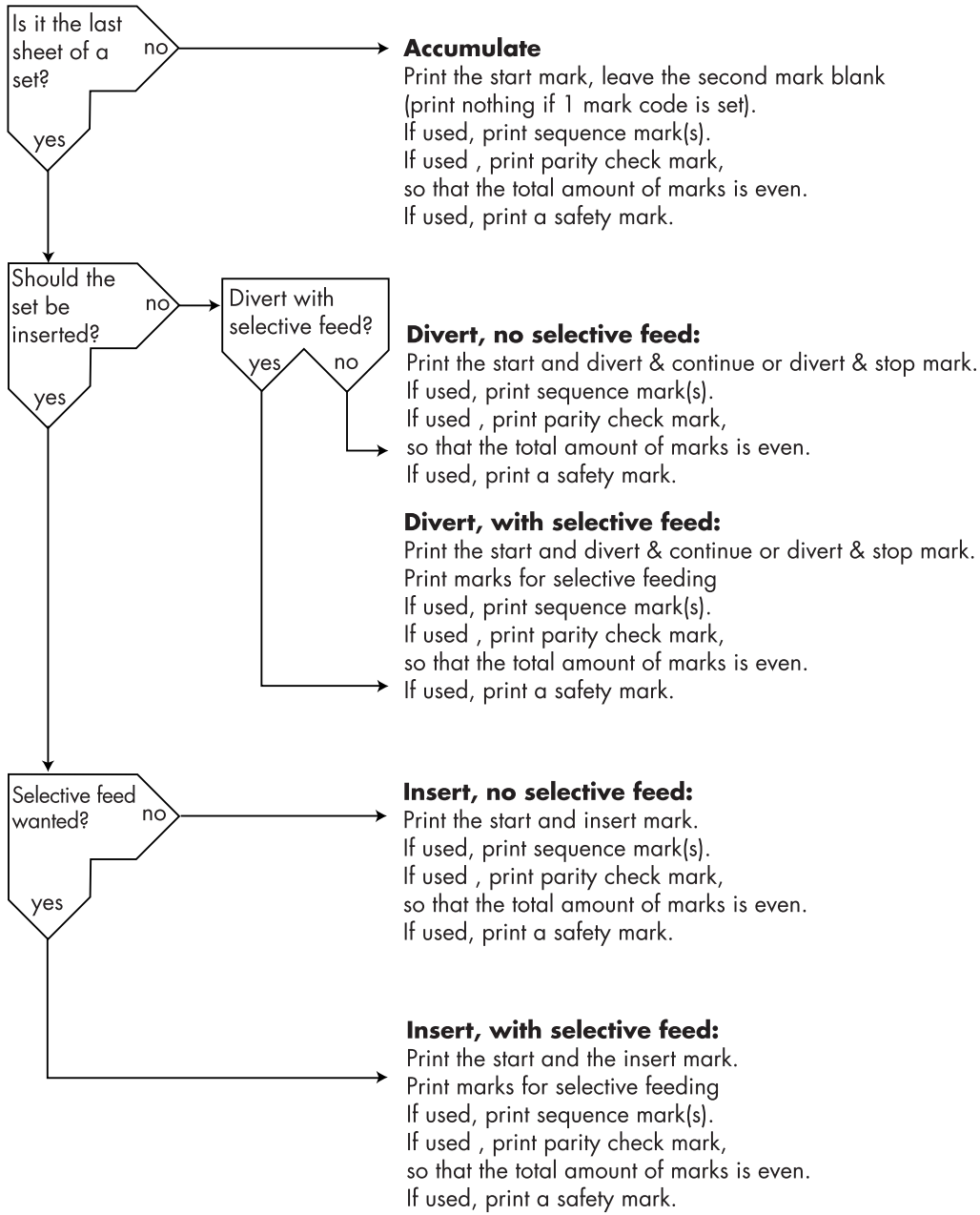
By adding a parity mark the reading code can be checked. When the OMR-2 code is used the sum of the marks per track has to be even.

8.6.6 Safety mark

The safety mark is used as an extra security in case of skewed paperflow in which case the system will give an error code if the safety mark has not been recognised (with skewed paper the reading head could miss parts of the reading code). For an example see fig. 19.
The safety mark also indicates the end of the reading code. This mark always has to be printed on the document if it has been activated.

8.7 Programming the code

The information on the last sheet of a set is used for further processing the set. The following print instruction can be set.



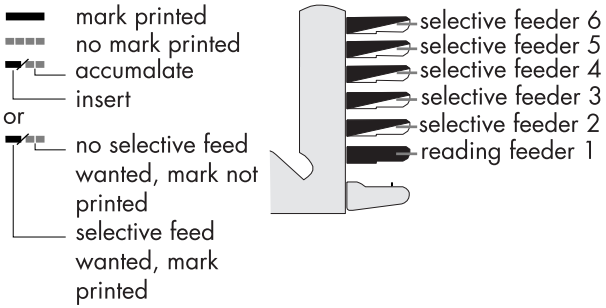


Fig. 20

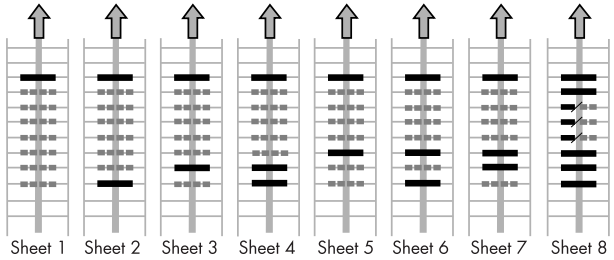


Fig. 21

8.8 Examples of OMR code

In fig. 20 the legend for the following example is shown. In this example feeder station 1 is the reading feeder. The feeder stations 2, 3 and 4 are selected for selective feeding.

8.9 Example

In fig. 21 a set of 8 sheets with three selective feeds (station 2, 3 and 4) and three sequence check marks selected is shown. The first position is used for the start mark which must be printed on every sheet.
The second mark position is used for the insert/ accumulate command. The mark is printed on the last sheet of the set (inserting is required). Position 3, 4 and 5 are reserved for selective feeding from station 2, 3 and 4. Print a mark on position 3 when a selective feed from station 2 is required. Print a mark on position 4 when a selective feed from station 3 is required. Print a mark on position 5 when a selective feed from station 4 is required. Position 6, 7 and 8 are used for the sequence check marks.